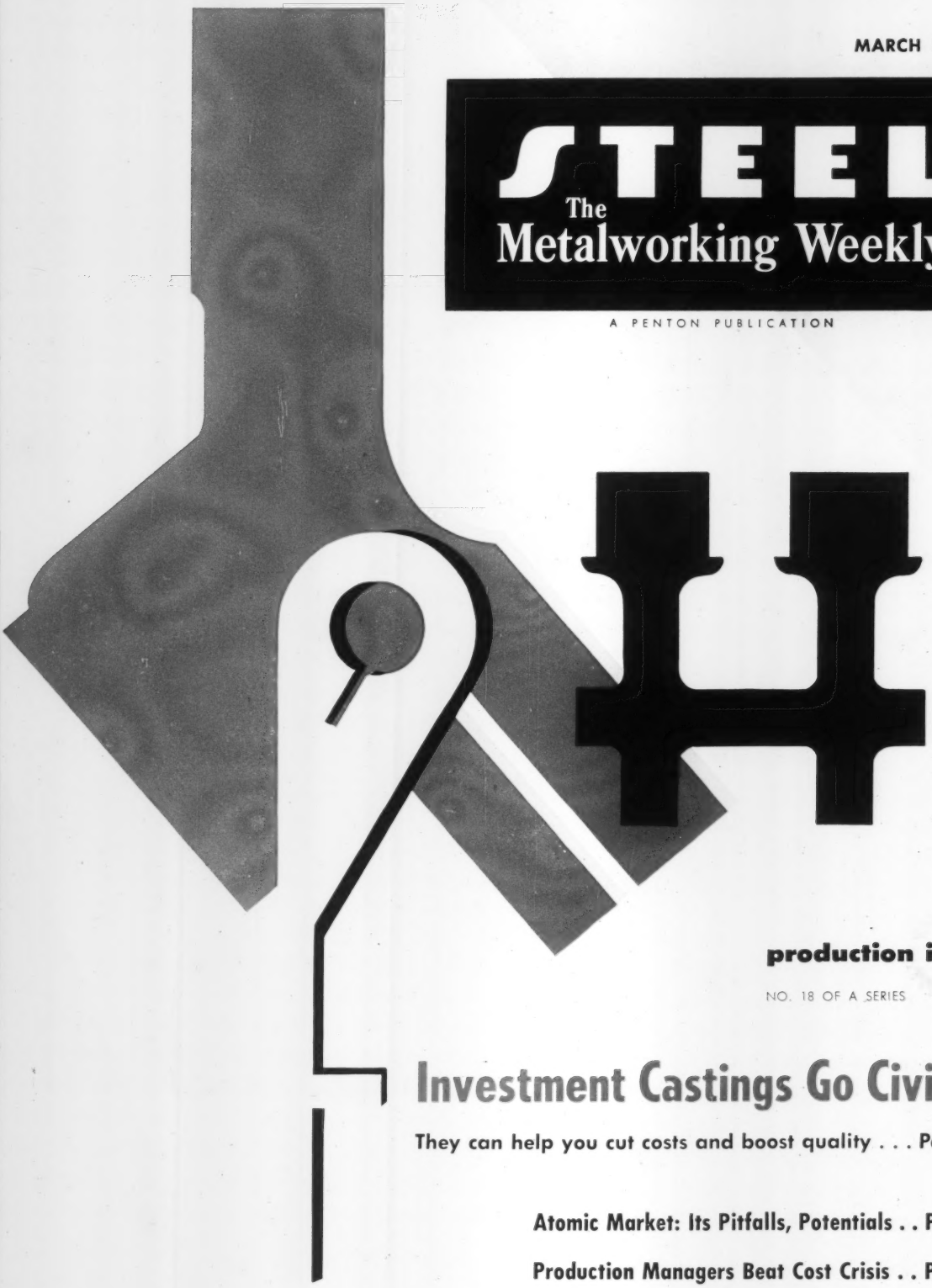
MARCH 3, 1958

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



production ideas

NO. 18 OF A SERIES

Investment Castings Go Civilian

They can help you cut costs and boost quality . . . Page 95

Atomic Market: Its Pitfalls, Potentials . . Page 53

Production Managers Beat Cost Crisis . . Page 64

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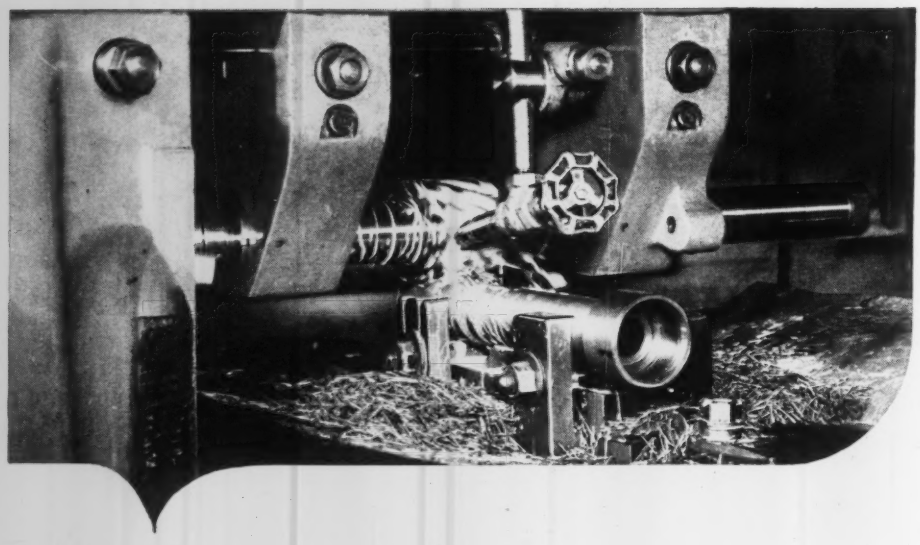

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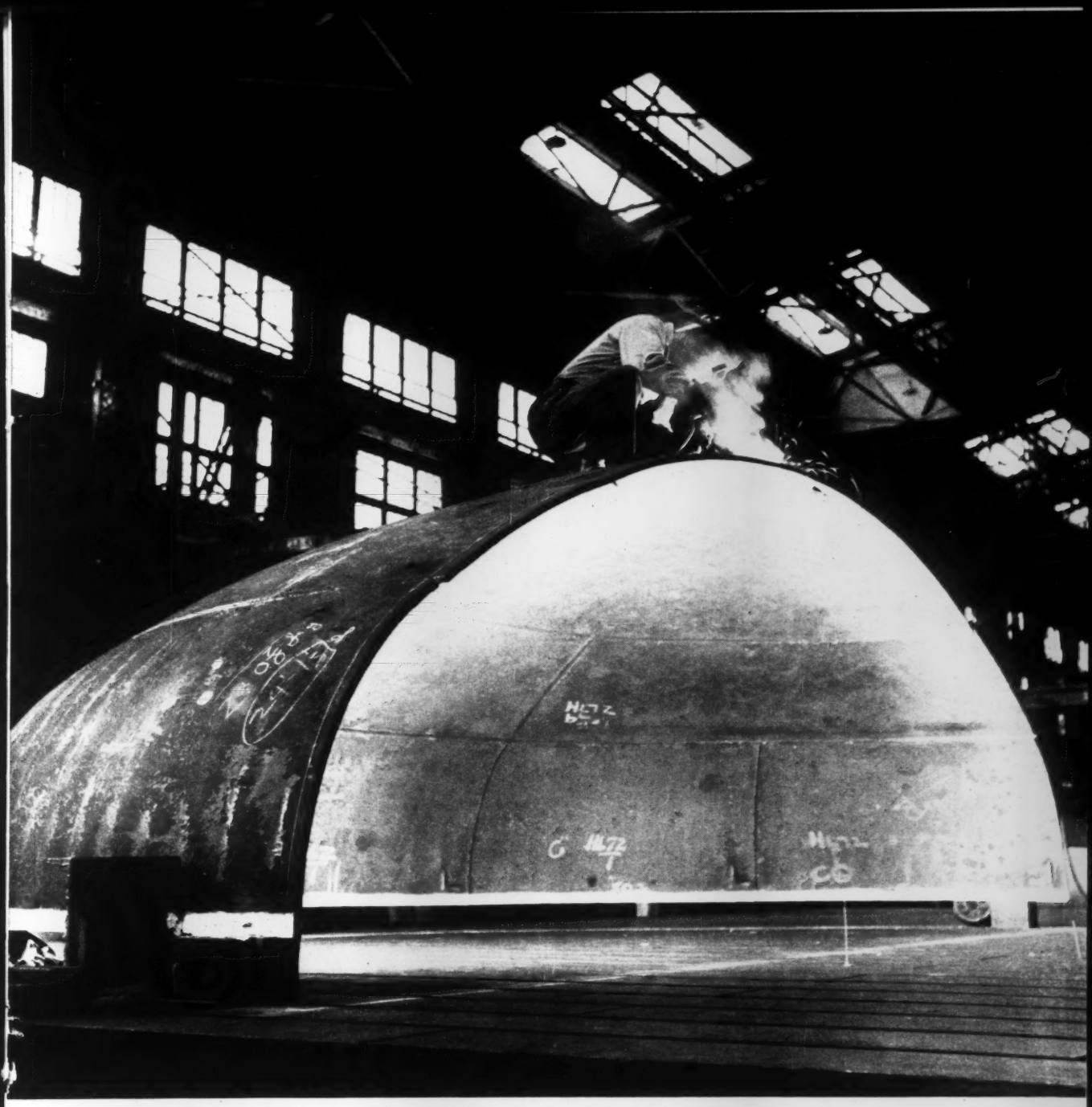

Welding Steel Plates

This elliptical head, shown here being fabricated from Bethlehem plates for Newport News Shipbuilding and Drydock Co., is a typical example of a welded structure in which the fabricator's prime responsibility is sound welds. Bethlehem plates are uniform in quality, so that with good welding technique, sound welds are assured. Bethlehem plates come in a full range of sheared or universal mill sizes. Write or phone the nearest Bethlehem sales office for complete information.

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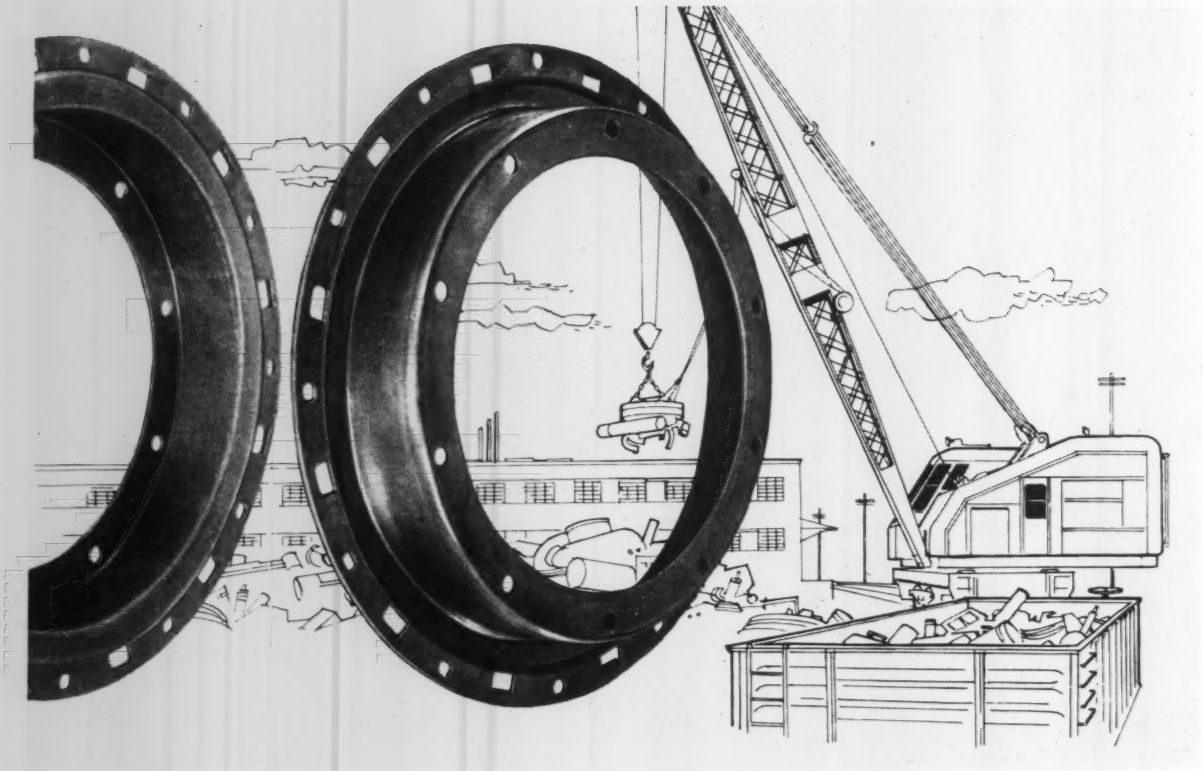


Stampings simplify clutch design

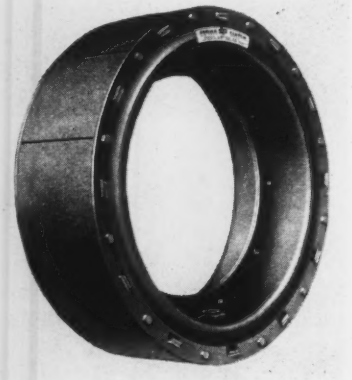
Housings custom stamped to close tolerances by COMMERCIAL eliminate costly machining.

Perfect shape and alignment maintained to assure safe, accurate, dependable control.

Pioneer in the development of air-actuated, functional clutches and brakes for use in many types of industrial and construction machinery, the Airflex Division of The Fawick Corporation uses COMMERCIAL custom stampings for the housings in its Type E air-ring clutches and brakes.

COMMERCIAL helped to design the required strength and close tolerances into these stampings, built the dies to produce them, and has been turning them out for The Fawick Corporation —without change in the original design— since 1944. Stampings are produced in ten different sizes, from 12 to 40 inches in diameter, to meet the varying load requirements of Fawick Airflex Type E clutch applications.

Typical close tolerances throughout each housing of +.005" −.000", +.005" −.005" and +.000" −.010", eliminate the need for costly machining of the stampings before final assembly



Gang-pierced in the stamped housings for the Fawick Airflex Type E clutch assembly, all holes are equally spaced ±.005" and all slots are equally spaced ±.010"

Designed into the stampings as well, is the *inherent strength* required to keep the shape, alignment and overall tolerances of the housings unchanged throughout their life in the field under the most severe operating conditions— constant wear, friction and resultant destructive heat. This unvarying strength in the stampings is an important factor in the dependable and trouble-free performance of Fawick Airflex Type E clutches.

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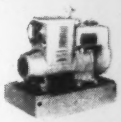
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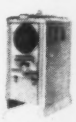
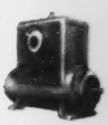
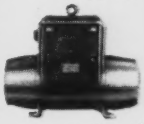

DC Rectifier


Electric Motor Drive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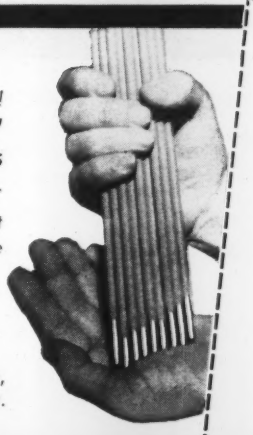

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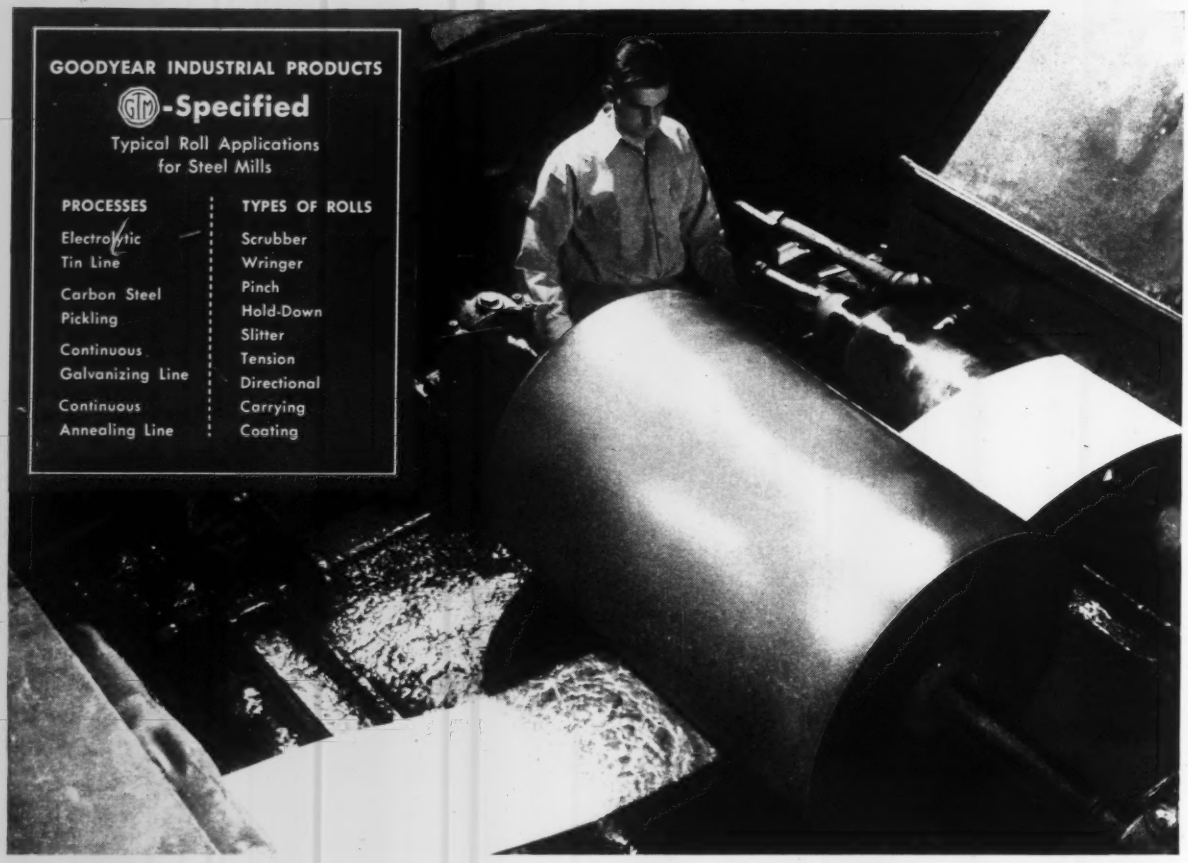

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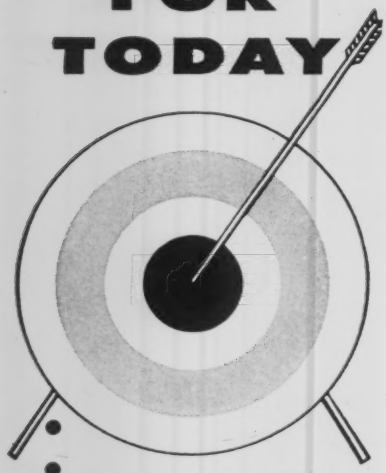
TARGET FOR TODAY



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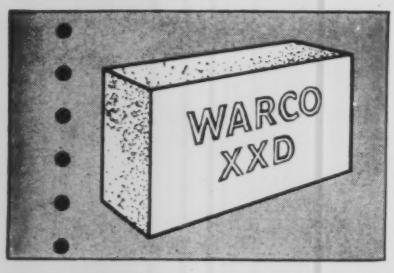

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behind the scenes

Up and Atom

The cab driver, a noted civic booster in the bustling suburb, glanced quickly at the great new factory, then turned to his inquiring passenger. "Beats me, Jack," he shouted. "To tell the truth, I got no idea what that outfit is. You see, it wasn't there this morning!"

Now, technological development is rapid, and the march of industrial progress takes your breath away, so it's possible the cab driver wasn't simply beating his gums. Indeed, things can change so swiftly in the metalworking world that markets can come and go before some of us are aware of it. Having in mind these considerations, the editors of STEEL took thought and considered the atomic future. "What," they asked themselves, "is metalworking going to get out of future atomic business?"

It will be observed at once that these boys were thinking positive thoughts; not for an instant did they dwell on the frightening possibility that man's predilection for messing with the atom might extinguish us as well as our interest.

They reasoned that the atomic future would provide a great challenge to the metalworking industry, so they began an investigation of market potentials. Some of the results of that investigation appear this week on Page 53. For a while it seems that atoms will be used to generate public power, to propel submarines, and to do something in medicine, but in every instance metalworking will be called upon for its planning, production, and services. When the roll of alert industrialists is called, be sure you're on it.

Dividends from Investment

Associate Editor Robert Jaynes has been creeping about of late like a man who has just successfully grafted a $10 bill on a fast growing rhododendron. "What's the big secret?" we inquired. "You're hiding something, and judging by your expression, it's either criminal or immoral, or both."

"Ah, you, too, noticed that I'm simply bursting with big news," gushed Mr. Jaynes. "I'm glad you asked me. The fact is, I recently finished a highly interesting report on investment casting, and if you want to play around with an idea for promoting it, try this: Investment in investment casting will pay big dividends."

Not one to willingly waste a sterling idea, we carefully filed this one away for future reference—say at the sesquicentennial of Premier Bulganin—and returned to Mr. Jayne's story. "What's with this investment business? We once knew a man who chloroformed a frog, covered it with plaster, baked it until the frog was cooked, shook out the ashes, poured in some bronze, and came up with the sharpest looking paperweight you ever did see. He said he practiced investment casting. Is that the kind of stuff you are writing about? Ain't it rough on frogs?"

"Certainly not. Investment casting—" and darned if he didn't give us the story from memory. What he said begins on Page 95.

Quest for Light

We turn once more to one of our favorite government publications for this item; it is listed in selected readings produced by the Government Printing Office. Described as an 81-page illustrated booklet, selling for the ridiculous price of 50 cents, it presents further contributions to the solution of simultaneous linear equations and the determination of eigenvalues of matrices. Naturally, it conveyed precisely nothing, but we had to admit it was a whale of a buy for 4 bits. The nearest mathematician, in terms of linear distance, was Roger Bolz, editor of *Automation*, sister publication of STEEL. Persons who write for *Automation* seem to operate in the fourth dimension, a sort of a never-never land of engineering and mathematical erudition. "Mr. Bolz," we asked bluntly, "what the hell is an eigenvalue of a matrix?"

"Hmm-m. Over your head, aren't you?" inquired the tactful Mr. Bolz. "Try this. Given a square matrix A of order n, the problem is to find vectors of dimension n that when multiplied by A, give a vector of the same direction. Now, for such a vector, Au equals su. Where s is a scalar, u is called an eigenvector—"

"Wouldn't you say 'u ARE called an eigenvector'?"

"Let's both go back to work," said the editor brightly. "If you don't value my time, eigenvalue it. Save your 4 bits, friend, and buy comic books."

U is an eigenvector; confound it, it still sounds wrong.

Twine Stwaighten This Out

Fred and Ralph were neighbors. To mark their garden patches, they agreed to invest $1 in a ball of twine. Fred bought one 8 in. in diameter. He unwound the twine until the ball was down to 4 in. in diameter. "I got my half," cried the honest fellow, tossing the remainder of the ball to Ralph. "There's yours. You owe me 50 cents." Ralph said something about a pig's eye, and they're still arguing. What did each owe, anyway?

Shrdlu

(Metalworking Outlook—Page 47)

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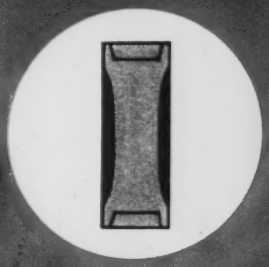

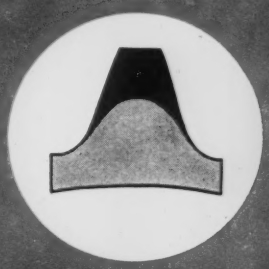

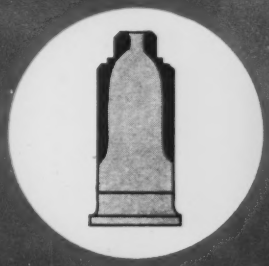

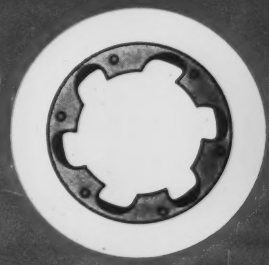

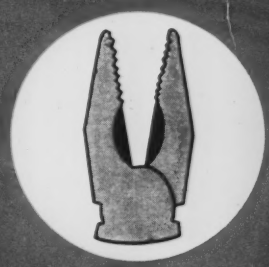

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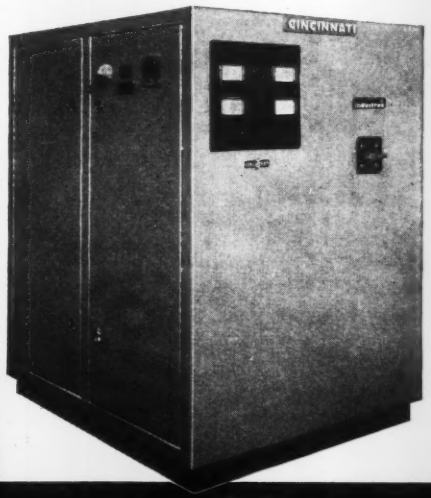

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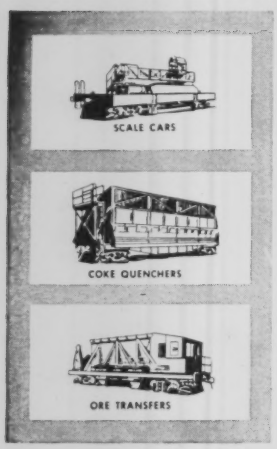

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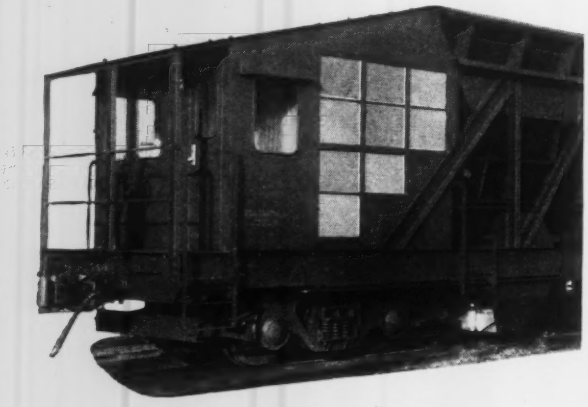

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Each car Atlas builds is engineered to specific task performance . . . and designed for personnel safety.

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CAR & MFG. CO.
1100 IVANHOE ROAD,
CLEVELAND 10, OHIO

LETTERS
TO THE EDITORS

Only Article of Its Nature

Your article, "Fabricating the Redstone Missile" (Jan. 20, Page 66), gives the reader some conception of what a missile body is made of, the construction, and just what it constitutes. This has been a mystery to the lay person for a long time. It is not only informative but well timed, and the only article of its nature that the writer has come across.

W. T. Cramer
Staff Metallurgical Engineer
American Steel & Wire Div.
United States Steel Corp.
Cleveland

Appreciates Price Service

Thank you for your ever-so-prompt service in furnishing us STEEL market prices. With this information, I concluded that I could not draw a definite pattern between the prices of two specific items and will govern myself accordingly in the future.

David W. Pettler
P. Pettler & Son
Beaver Falls, Pa.

Lauds Management Article

The first article of your 1958 Program for Management, "Balance Your Management" (Feb. 17, Page 113), was well thought out and presented. You are to be congratulated.

John A. Pruessner
Manager of Equipment,
Building, & Utilities Maintenance
Sandusky Foundry & Machine Co.
Sandusky, Ohio

Excellent Marketing Article

It is my belief that top and executive management of many companies have not had a means of communication which can inform them on consumer acceptance of the company's products and translate this basic information into product planning and marketing procedures. That is the basic thinking behind the organization of Marketing Unlimited.

Yesterday I picked up your Metalworking Yearbook (Jan. 6, 1958) and read your article, "While the Boom Idles—Marketing Shifts Into High Gear" (Page 115). You can understand my enthusiasm in reading such an excellent editorial which

(Please turn to Page 12)

At Campbell, Wyant and Cannon—

Quality Control of camshafts starts with

HANNA PIG IRON

Campbell, Wyant and Cannon Foundry Company, division of Textron, Inc., has long been one of the world's leading suppliers of automotive castings. And throughout their many years of pioneering in metallurgy and foundry practice, Campbell, Wyant and Cannon has been a regular user of Hanna pig iron—both standard and silvery.

Typical of C.W.C.'s precision production in volume at their Muskegon, Michigan, foundry are cast camshafts, which were first introduced by C.W.C. to the automotive industry 25 years ago and are now used throughout the world.

Customers' specifications for these camshafts are extremely precise. Dimension, composition, including chemistry and metallurgical structure, hardness—all are vitally important.

In one of the many testing procedures employed to assure that casting quality is up to specifications, C.W.C. through the use of a direct reading spectrometer determines approximately every 20 minutes the analysis of samples taken from electric furnaces and ladles. The commercial application of spectrographic analysis of metals in the foundry was first worked out by C.W.C. in conjunction with the University of Michigan. Only metal made with pig iron of accurate analysis and superior uniformity, like Hanna pig iron, can pass this exacting quality control check.

Hanna produces all regular grades of pig iron as well as HannaTite and Hanna Silvery. All grades are available in the 38-lb. pig and the smaller HannaTen 12½-lb. ingot. Your Hanna representative will be pleased to tell you more about the advantages of using Hanna pig iron.

At 20-minute intervals, C.W.C. checks metal analyses with a direct reading spectrometer.

THE HANNA FURNACE CORPORATION

Buffalo • Detroit • New York • Philadelphia

Merchant Pig Iron Division of

NATIONAL STEEL CORPORATION

A few of the 50 million camshafts produced by Campbell, Wyant and Cannon Foundry Company.

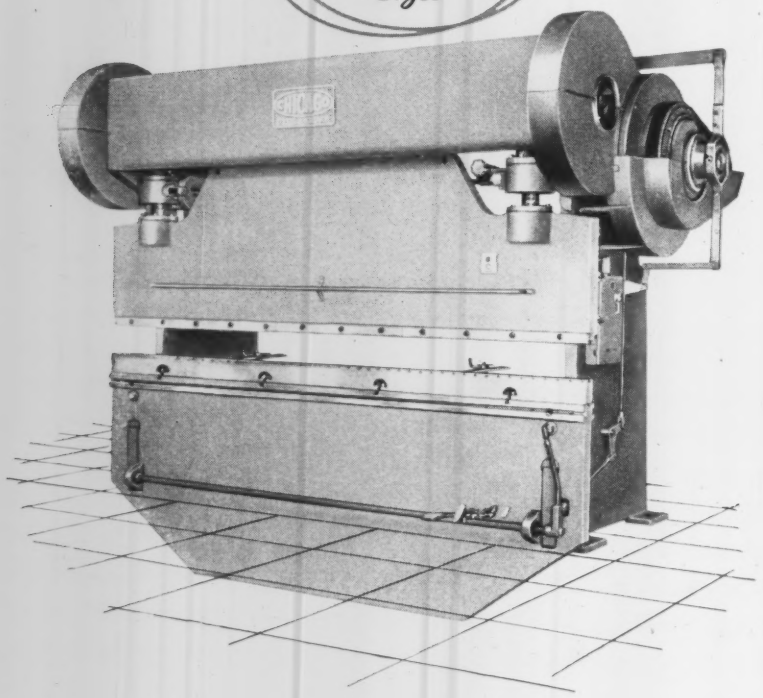
CHICAGO® PRESS BRAKES

for sheet metal and plates

Advanced Design

50 Standard Sizes

Capacities 11 to 450 tons



This is one of the Series D CHICAGO press brakes. It has a bending capacity of 10 feet by ¼ inch—150 tons. Over-all bending length is 12′-2″.

Complete recommendations for any job on request.

6777

CHICAGO DREIS & KRUMP

Press Brakes • Straight-Side-Type Presses • Press Brake Dies

Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

7458 South Loomis Boulevard, Chicago 36, Illinois

LETTERS

(Concluded from Page 10)

is so accurate and pertinent to us. Especially appropriate are the four paragraphs—Year of the Marketeer, Finding What the Customer Wants, Charting the Market, and Setting the Price. They represent the best description of our basic purpose and functions that I have ever heard or read.

C. M. Daniel

Marketing Unlimited
Cedar Rapids, Iowa

Hanging on until Tide Turns

I am heartily in accord with the "darkest before dawn" emphasis given near the end of your article, "The Tool Outlook for '58" (Feb. 3, Page 66). There is no question as to the position for capital goods in the long range picture. Hanging on, however, until the tide turns does present some serious difficulties.

K. L. Finkenstaedt

Executive Vice President
W. F. & John Barnes Co.
Rockford, Ill.

• • •

I feel that 1958 will still be a good year, but the manufacturers themselves must put less emphasis on how poor business is and greater emphasis on a good machine tool replacement program.

Theodore A. Wiedemann

Vice President
Wiedemann Machine Co.
Philadelphia

Copies to Sales Force

We have read with interest your article, "Bending Machines Form Precision Parts" (Feb. 10, Page 79). We design and manufacture aircraft and missile plumbing. This includes high quality, close tolerance tube bends. We would appreciate 12 copies to distribute to our sales force.

W. Freundlich

Assistant-Chief Engineer
Resistoflex Corp.
Roseland, N. J.

Lease or Buy Company Cars?

We are considering the problem of leasing rather than buying company cars. Your article, "Should You Lease—or Buy?" (Feb. 10, Page 48), will be helpful in evaluating the comparison.

Robert T. Abbe

Purchasing Agent
Hermetic Motor Dept.
General Electric Co.
Holland, Mich.

Guide for Steel Buyers Is Bible

I have a bible in my desk, "Guide for Steel Buyers" (July 12, 1954, insert), which I constantly refer to. Please advise whether you have made a later revision of this guide or have supplemental inserts which bring it up to date.

T. M. Hogan

District Sales Manager
Jones & Laughlin Steel Corp.
New Orleans

• *Your issue is the latest.*

"WEIRKOTE'S ZINC COATING STAYS SKINTIGHT. NO PEELING OR FLAKING—CAN ELIMINATE DIPPING OR PLATING AFTER FABRICATION!"

Q. Sure, but what happens on the tough jobs—like deep drawing or crimping?

A. You can work Weirkote right to the limit of the steel itself. And as I said, no peeling or flaking.

Q. Then where's the miracle? We tried galvanized before. And it struck out. Too much trouble, too much cost fixing it up after fabrication.

A. No miracle. It's just that Weirkote's made by the continuous process which integrates zinc and steel so that the toughest fabrication won't break down the bond.

Q. That means then that Weirkote can eliminate the need for plating or dipping to assure uniform corrosion protection for the most intricate part . . . is that the picture?

A. Yes, that's exactly the picture . . . and besides, Weirkote is now treated to inhibit wet storage (white oxide) stain.

Send today for free booklet that details the time- and cost-saving advantages of using skintight zinc-coated Weirkote. Write Weirton Steel Company, Dept. B-8, Weirton, West Virginia.

WEIRTON STEEL COMPANY

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INGENUITY

call KE for plant expansion or new facilities

Our most treasured ingredient at Kaiser Engineers is ingenuity. It manifests itself constantly in new, more efficient, and tested ways of designing and building our clients' plants.

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KE ingenuity—applied in fresh, daring ways since the start of contracting in 1914—can benefit your facilities. Investigate KE now!

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economic analysis • plant location • engineering • design • procurement • expediting • construction

This jewelry chain of **COPPERPLY®** wire might give you a gem of an idea!

• Copperply wire, a National-Standard development, is a steel wire, electroplated with copper to required thickness and with unmatched coating uniformity and concentricity.

It makes sense for jewelry chain manufacturers to use Copperply wire instead of copper or brass wire, because material costs are greatly reduced. It also provides an ideal base for plating if desired, it excells in strength, and provides more footage per pound with resultant production and handling economies.

To date other uses in light coating weights include: wrapping for piano wires, reinforcement for eyeglass temples, decorative tinsel, fanning mill cloth, and springs where a combination of power and electrical conductivity is needed. A major use in heavy coating weights is in the field of communications.

Here we touch only briefly on a few of the unique Copperply features, but perhaps enough to spark an idea worth exploring. And you'll find that the word "cooperation" has real meaning at National-Standard . . . whether your interest lies in Copperply wire or any of our other products. Try us.

NATIONAL NS NATIONAL STANDARD STEEL WIRE **STANDARD**

DIVISIONS: **NATIONAL-STANDARD, Niles, Mich.**; *fine wire, stainless, music spring and plated wires* • **WORCESTER WIRE WORKS, Worcester, Mass.**; *music spring, stainless and plated wires, high and low carbon specialties*
WAGNER LITHO MACHINERY, Secaucus, N. J.; *metal decorating equipment* • **ATHENIA STEEL, Clifton, N. J.**; *flat, high carbon spring steels* • **REYNOLDS WIRE, Dixon, Ill.**; *industrial wire cloth*

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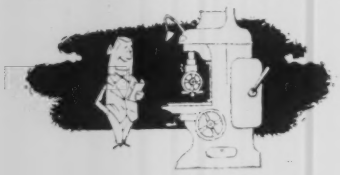
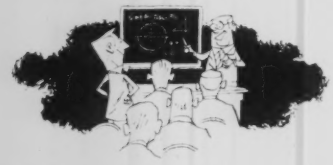
CONVENTION CENTER
PHILADELPHIA MAY 1-8

SEE all the very latest advances and improvements in more than thirty major categories of industrial products.



ATTEND top-level conferences, conducted by recognized authorities on the newest production techniques and developments.



MEET and exchange ideas with management, engineering, production, sales people from the nation's leading industrial concerns.

INSPECT the modern equipment and up-to-the minute manufacturing methods being utilized in booming Delaware Valley plants.

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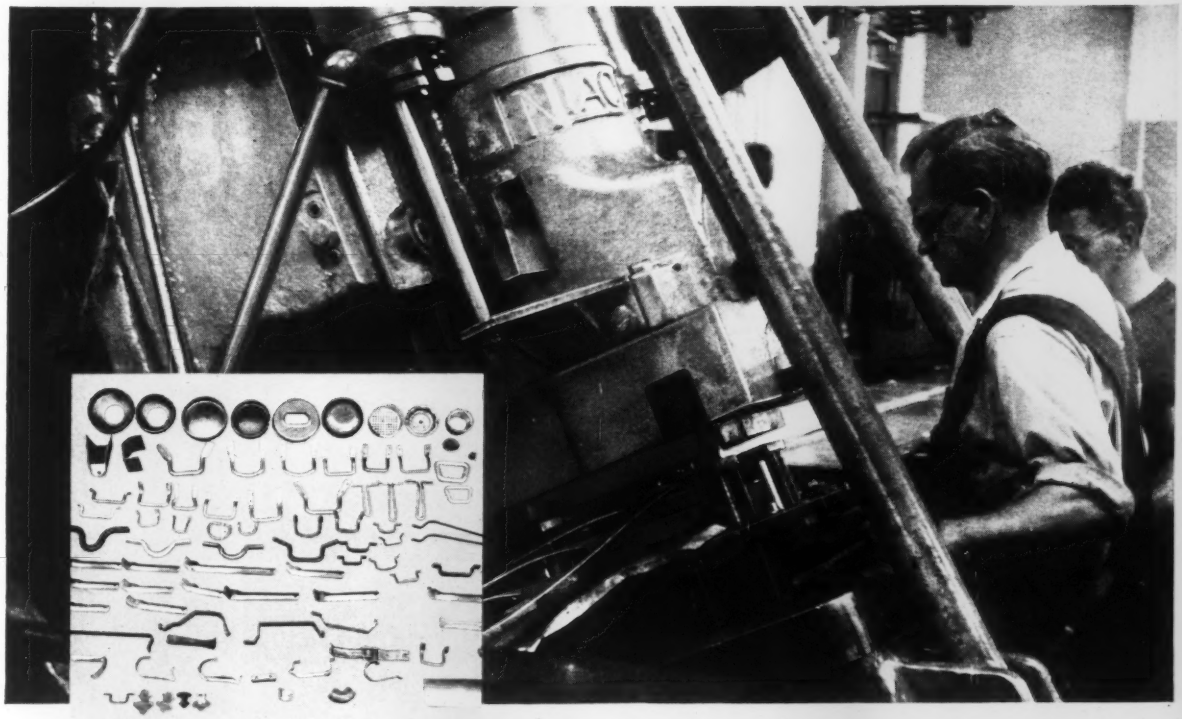

"We stamp them all using just 2 Cities Service Oils!"

...says Res Manufacturing Company Milwaukee, Wisconsin

Presses shift to numerous operations without ever changing oil, thanks to versatility of the 2 Cities Service oils used for all jobs.

Handles by the thousands are produced by Res for cooking utensils and similar items. Finish is excellent, thanks to Cities Service oil.

It's doubtful if anyone makes a more diversified line of stamped and formed metal products than Res Manufacturing Company.

With its 21 presses, ranging from 15 to 200 tons capacity, Res turns out millions of articles a year . . . wire handles, metal handles, wire forms, drawn shells, lifting loops, and parts for electrical controls, to mention just a few.

"All require the best possible finish and all get it with the use of just two Cities Service oils," says Assistant Plant Manager Herbert W. Krueger.

"For drawing, shaping, and punching aluminum, we use Cities Service Chillo #2 with excellent results. Where drawing, swedging or forming of steel and brass is required, we use Cities Service Chillo 12 and get equally fine results.

"Not only do these two Cities Service oils handle all our jobs and produce the best possible finish, but we also find they increase tool life and hold scrap to a minimum. In short, these are the best oils we have ever seen."

Like Res Manufacturing, chances are your operation can be simplified with the right Cities Service oils. Talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N.Y.

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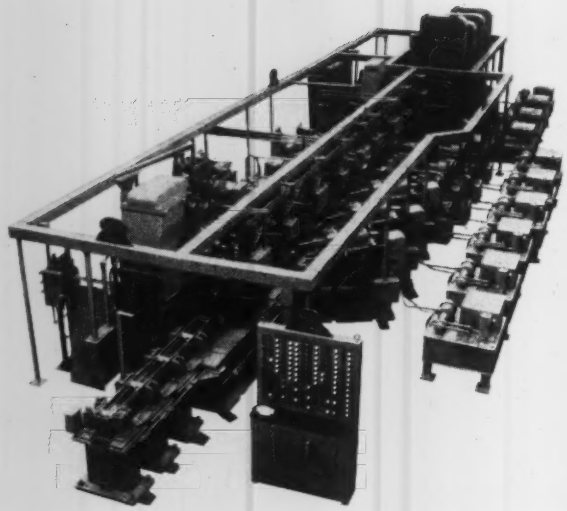

from transfer machines

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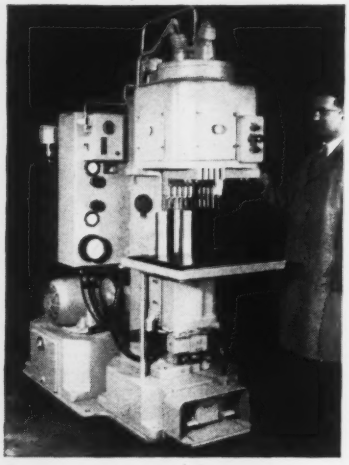

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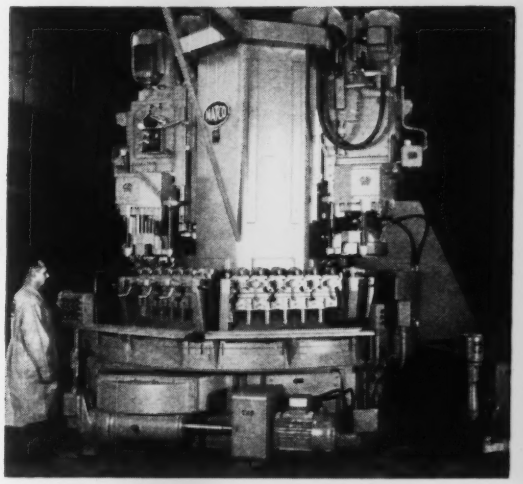
Somewhere in Natco's experience is a money-saving idea for you!

Natco All Six



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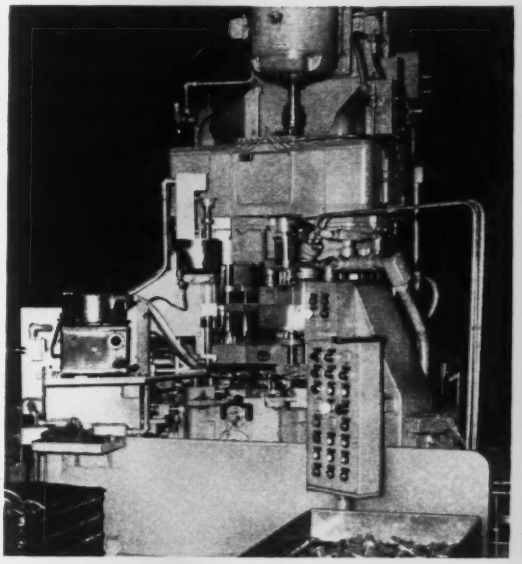

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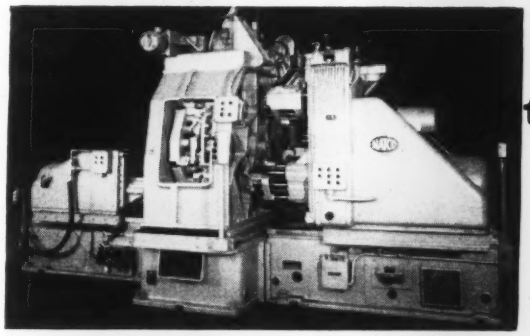

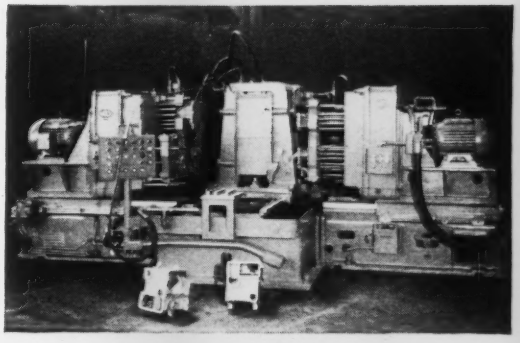

...and everything in between

Drilling, boring, facing, tapping.

National Automatic Tool Company, Inc.,

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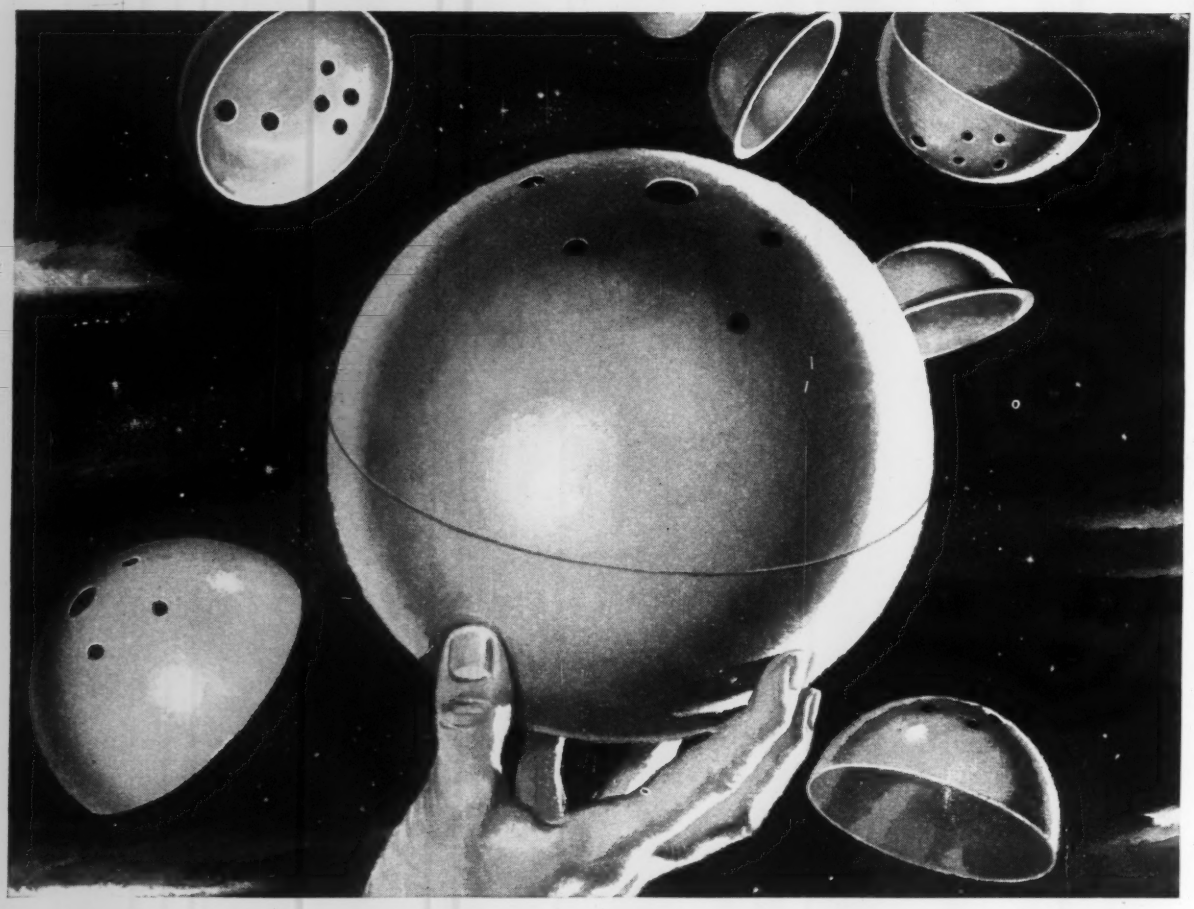
SAVE WEIGHT, FIGHT CORROSION, ADD STRENGTH AND TOUGHNESS



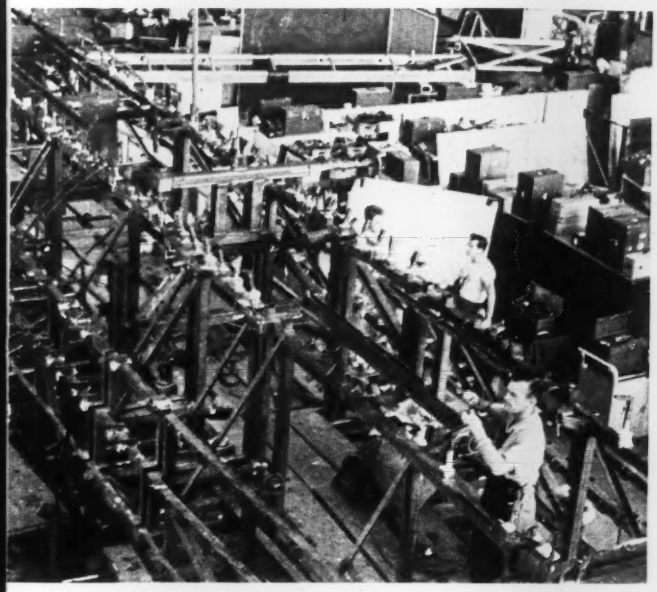
TITANIUM HEMISPHERES ARE STRONG, LIGHTWEIGHT, DEFY CORROSION BELOW −150°C. They are used in highly specialized aeronautical applications calling for high strength, light weight, and resistance to the severe corrosive action of liquefied gases at severe sub-zero temperatures.

Alloy Products Corporation, Waukesha, Wisconsin, utilizes three major advantages of commercially pure Republic Titanium, Type RS-70, in meeting these requirements:

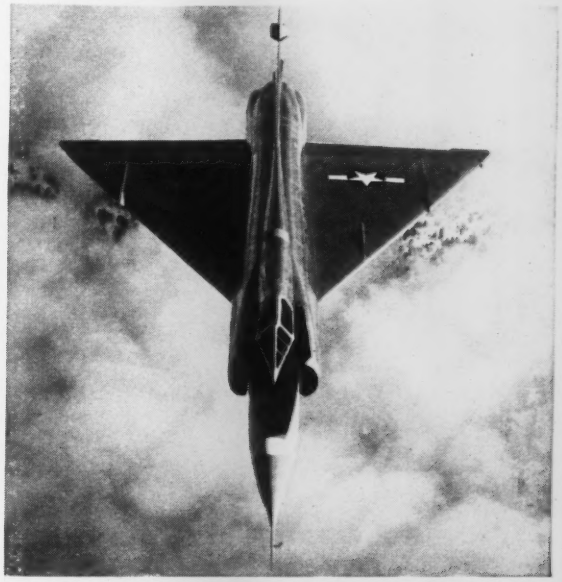
1. Titanium reduces weight without sacrifice of strength or safety. In fact, titanium offers the highest strength-to-weight ratio of construction materials.
2. This exceptionally high-strength property enables this product to withstand burst pressures in excess of 2,000 lbs. psi.
3. Titanium's extremely high corrosion-resistant properties defy the corrosive action to which the units are constantly exposed.

The entire fabricating operation is performed without difficulty and with little change in procedure as compared to other materials. Fabricating steps include drawing, trimming, piercing, extruding, and welding.

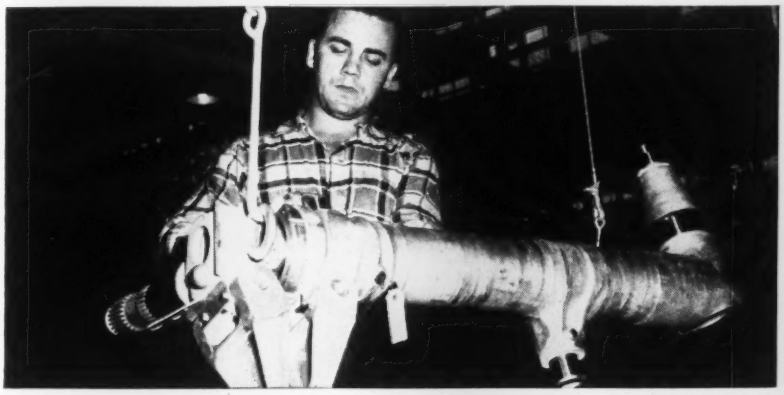
Does this application of Republic Titanium generate an idea for your product that needs to be strong, lightweight and corrosion-resistant? Republic Metallurgists are ready to help you apply titanium's advantages now. This service is confidential and without obligation. Mail coupon today for more information.



STRENGTH AND SAFETY IN MISSILE jig and fixture assemblies is provided by 4" x 4" square carbon steel mechanical tubing. It is used because of its greater strength-to-weight ratio in structural applications. Elimination of accident-causing sharp edges adds to the safety margin. Republic Steel and Tubes Engineers will help you design ELECTRUNITE Mechanical Tubing into your product to speed production, cut costs, save weight, improve product performance. Mail coupon.



TOUGHNESS, HIGH STRENGTH-TO-WEIGHT RATIO, resistance to heat and corrosion are advantages of ENDURO Stainless Steel designed into both structural and operating parts of supersonic Convair F-102A. ENDURO is made for flight in both military and civilian aircraft. Its outstanding combination of properties offers almost unlimited freedom in design and application. Republic will help you apply it to best advantage. Write us.



MAXIMUM RESISTANCE TO FATIGUE, strength and toughness are provided by Republic Alloy Steel in landing-gear struts of North American's F-100. The struts are made by Bendix Aviation Corporation. Bendix and Republic metallurgists, working closely with North American engineers, developed a new grade of alloy steel to meet exacting requirements of the strut's inner and outer cylinders. It has a strength range of 220,000—240,000 psi and maintains this great strength at wide temperature extremes. Republic Alloy Metallurgists are available to help with your projects.

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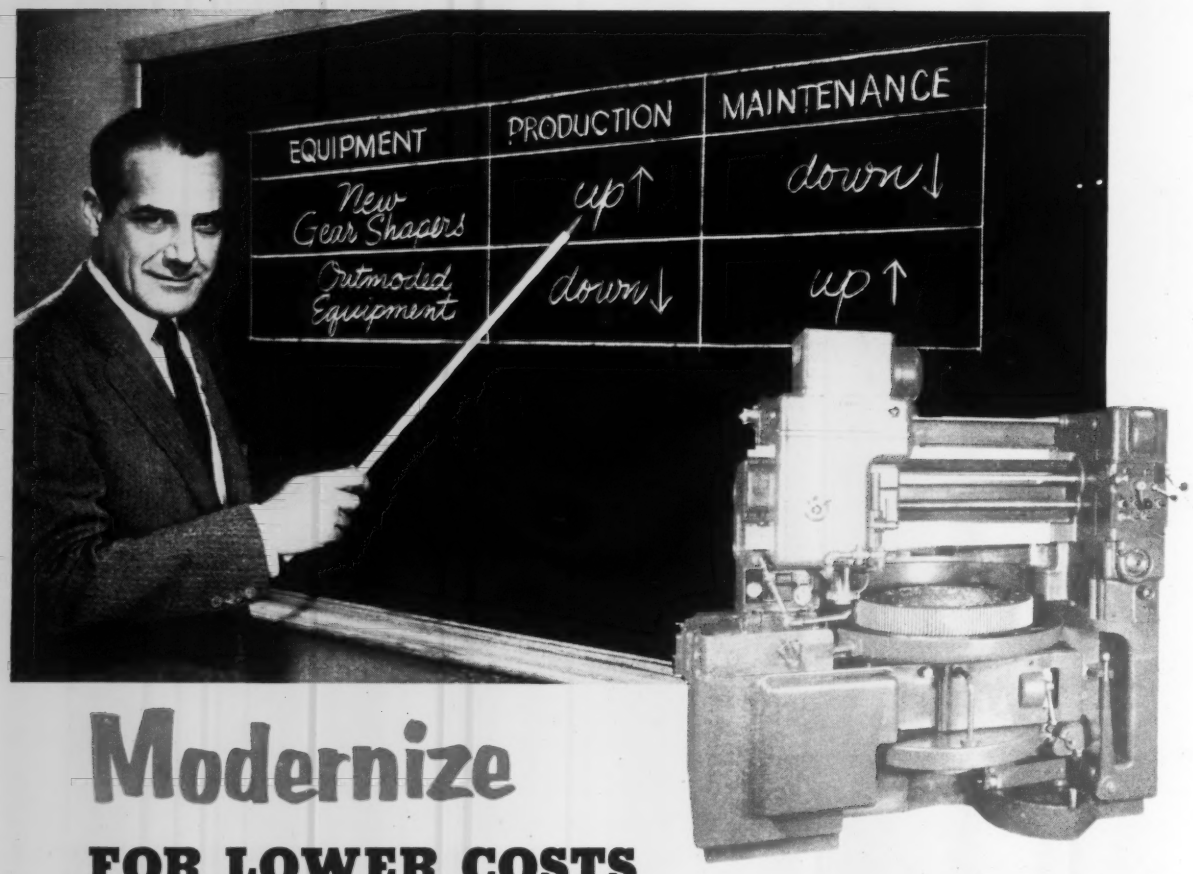

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FOR LOWER COSTS

with New Fellows 36-Type Gear Shapers

Two new Fellows 36-Type Gear Shapers can produce more than three or four older machines ...and give you extra production versatility, too. In many plants, new Fellows production equipment has lowered unit production costs by more than half, earned back its cost in three years or less.

Fast, accurate, and simple to set up for a wide range of jobs up to 36" pitch diameter, the Fellows 36-Type is ideal for short runs of varied parts as well as for long runs. Rigid, husky construction permits close tolerances on internal or external spurs, helicals, and herringbones, as well as an almost unlimited variety of cams, splines, and other non-involute shapes.

Why not ask a Fellows Representative to *show* you in your plant where you can cut production costs with newer machines? Write, wire, or phone any Fellows office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont

Branch Offices:
1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N. J.
5835 West North Avenue, Chicago 39
6214 West Manchester Ave., Los Angeles 45

THE PRECISION LINE

Fellows *Gear Production Equipment*

CALENDAR
OF MEETINGS

Mar. 3-5, American Management Association: Special finance conference. Statler Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y. President: Lawrence A. Appley.

Mar. 4-6, Society of Automotive Engineers: National passenger car, body, and materials meeting. Sheraton-Cadillac Hotel, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Mar. 9-11, American Machine Tool Distributors Association: Spring meeting. Roosevelt Hotel, New Orleans. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Mar. 10-14, National Association of Manufacturers: Institute of industrial relations. Hollywood Beach Hotel, Hollywood, Fla. Association's address: 2 E. 48th St., New York 17, N. Y. Information: Mrs. Sybyl S. Patterson, associate director, Industrial Relations Div., NAM.

Mar. 11-13, Instrument Society of America, Pittsburgh Section: Annual conference on instrumentation of the iron and steel industry. Roosevelt Hotel, Pittsburgh. Secretary: Frank K. Briggs, Atomic Power Div., Westinghouse Electric Corp., Large, Pa.

Mar. 12-14, Pressed Metal Institute: Annual spring technical meeting. Sheraton-Cadillac Hotel, Detroit. Institute's address: 3673 Lee Rd., Cleveland 20, Ohio. Managing director: Harold Daschner.

Mar. 15-18, National Association of Waste Material Dealers: Annual meeting. Waldorf-Astoria Hotel, New York. Association's address: 2 E. 48th St., New York 17, N. Y. Managing director: Clinton M. White.

Mar. 17-18, Steel Founders' Society of America: Annual meeting. Drake Hotel, Chicago. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Mar. 17-19, Atomic Industrial Forum Inc., and National Industrial Conference Board Inc.: Joint atomic energy management conference. Palmer House, Chicago. Information: AIF, 3 E. 54th St., New York 22, N. Y., or NICB, 460 Park Ave., New York 22, N. Y.

Mar. 17-20, American Society of Mechanical Engineers: Aviation division conference. Statler-Hilton Hotel, Dallas. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Mar. 17-21, Nuclear Congress and Atomic Industry Trade Show: International Amphitheatre, Chicago. Information: International Atomic Exposition Inc., 12 S. 12th St., Philadelphia 7, Pa.

Mar. 17-21, National Association of Corrosion Engineers: Annual conference and exhibition. Civic Auditorium, San Francisco. Association's address: 1061 M & M Bldg., Houston 2, Tex. Executive secretary: A. B. Campbell.

Mar. 19-21, American Management Association: Special conference on product development. LaSalle Hotel, Chicago. Association's address: 1515 Broadway, New York 36, N. Y. President: Lawrence A. Appley.

Mar. 19-21, Electronic Industries Association: Spring meeting. Statler Hotel, Washington. Association's address: 1721 DeSales St. N. W., Washington 6, D. C. Secretary: James D. Secrest.

Mar. 19-21, International Acetylene Association: Annual convention. Bellevue-Stratford Hotel, Philadelphia. Association's address: 205 E. 42nd St., New York 17, N. Y. Secretary: H. F. Reinhard.

STEEL WAREHOUSE "TAKES TO THE AIR"

Fig. 1 — TRAK-RAK fork lift at top of column, lifting bundle of steel rod. Unit serves 3 long aisles of racks.

TRAK-RAK SYSTEM INCREASES STORAGE SPACE, SAVES 22% CAPITAL BUILDING INVESTMENT

When A. C. Leslie & Co. Limited, needed more storage area in its busy Toronto steel warehouse, it decided to "reach for the ceiling" with a Chicago Tramrail TRAK-RAK System of vertical storage and handling. As a result, the company estimates it not only saved 22% of projected capital building costs, but increased the overall efficiency and speed of the Toronto operation. The company expects to gain further economies as the TRAK-RAK system is used to its full extent.

A 5 ton capacity toprunning TRAK-RAK Crane was installed in each of two 40 ft. wide bays to serve specially designed 18 ft. high material storage racks (Fig. 1). Each crane bridge has an overhead trolley, from which is suspended an electrically operated rotating column

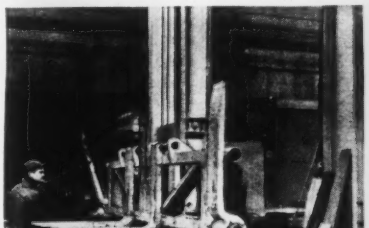


Fig. 2 — Carriage equipped with 2 pairs of forks. Operator is flopping outer forks up.

equipped with a special fork lift. All operations of the fork lift, which revolves to serve either side of the aisles, moves toward or away from the racks, and raises or lowers on the column, are controlled by the operator who rides with the carriage.

Two pairs of forks are mounted on the carriage. The outer forks may be flopped back (Fig. 2) leaving the inside forks in position for handling palletized or crated material. For handling long boxes, bars, etc., the outside forks are flipped back into working position.

A TRAK-RAK feature which added to handling speed and insured safe operation was the safety interlock switch system which prevents the column from running

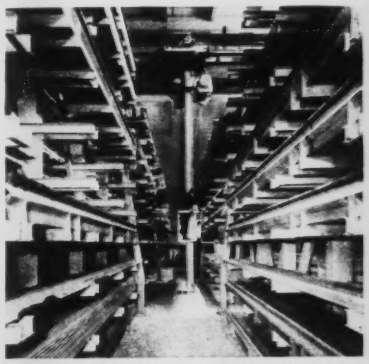


Fig. 3 — TRAK-RAK column requires minimum aisle space for operation.

into a rack and permits full rotation only when the unit is safely beyond the end of the racks.

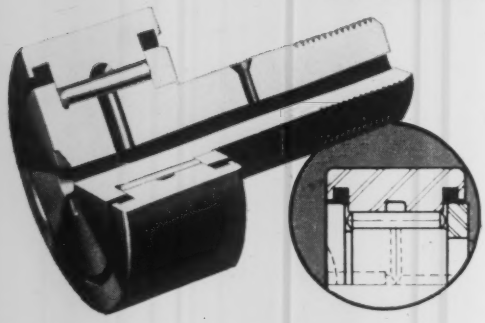
The A. C. Leslie Company reports that a similar TRAK-RAK System installed in its Montreal warehouse permitted a 37% savings in capital building investment with equally good operating efficiency and economy.

For complete details on the TRAK-RAK System of vertical storage and handling, write the manufacturer:

CHICAGO TRAMRAIL CORPORATION
1326 S. Kostner Avenue • Chicago 23, Ill

BEARING TIPS by McGill

sealed CAMROL® bearings lock out contamination in critical cam follower applications

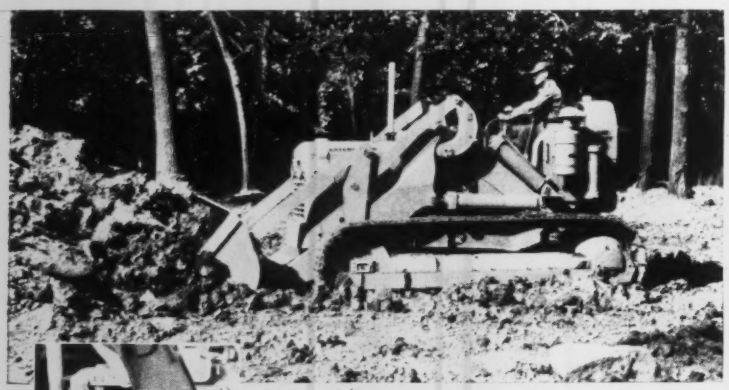


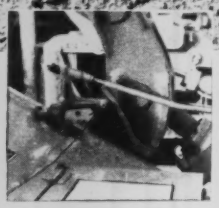
Now Sealed and Prelubricated

The new SCF series of the famous CAMROL cam follower completely seals out dirt, chips, moisture, etc. — an important advantage where the life of an ordinarily open mounted cam follower can be materially increased with adequate protection against contamination. Also the sealed bearing is pre-lubricated with provision made for easy re-lubrication, if desired, through either end of the stud.

Specially treated synthetic seals are contained in the outer race undercuts over the stud flange and roller retaining washer. For added protection, all external surfaces of the bearing are treated to provide a corrosion resistant, black ferrous oxide surface.

These same advantages are available in the SCYR sealed series Cam Yoke Roller (without stud). Specify CAMROL bearings with the built-in seals that preserve cam follower dependability in critical cam action, support or track roller application.

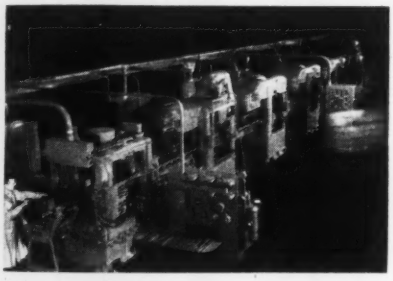




Built-in seals protect and preserve CAMROL® bearings from contamination in CATERPILLAR-built TRAXCAVATORS®

McGill SCF series sealed CAMROL bearings provide the cam action that positions the bucket of the No. 977 Traxcavator unit at the selected digging angle. Mounted on bell crank arms that are actuated by contact with a cam shoe on a hydraulic cylinder linkage, these bearings are operating in the open and exposed constantly to dust, dirt and moisture. External surfaces have a black ferrous-oxide finish to prevent corrosion. These sealed McGill cam followers eliminate the need for relubrication and maintenance after installation. Caterpillar uses other McGill bearings including twelve CYR series cam yoke roller bearings in the flywheel clutch.

378 sealed CAMROL® bearings guide engine blocks in INGERSOLL automatic milling machine



The sealed CAMROL bearings used in this machine, guide cylinder blocks during transfer through various milling, boring and drilling operations. The bearings, used in place of guide bars, eliminate surface scratching of the 200 to 300 pound blocks which are transferred at speeds up to 400 feet per minute. Blocks are processed at the rate of 95 per hour. Ingersoll reports freer movement, accuracy of positioning and materially longer bearing life due to the new design that seals metal chips out of the bearings.

Insure performance with McGILL®

MULTIROL® GUIDEROL® CAMROL®
Precision Needle Bearings

McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

Memo to a Man of "Parts"

The number of different parts made from Roebling High Carbon Specialties, Flat Wire and Spring Steel are close to countless.

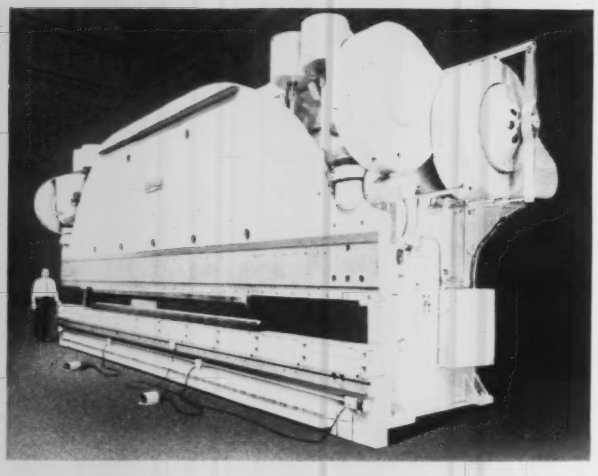
Some things you can count on, though, are the consistent dimensional and mechanical uniformity you get with any Roebling High Carbon Specialty. They are the qualities that contribute to speeding *your* production and cutting *your* costs.

They are high qualities that make for high values. Next time you need flat wire or spring steel, specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it



How press brake construction affects job costs

Only accurate machines can make accurate bends. The accuracy obtainable from a press brake begins with its structural rigidity. Cincinnati Press Brakes give you maximum accuracy and rigidity because of these construction features:

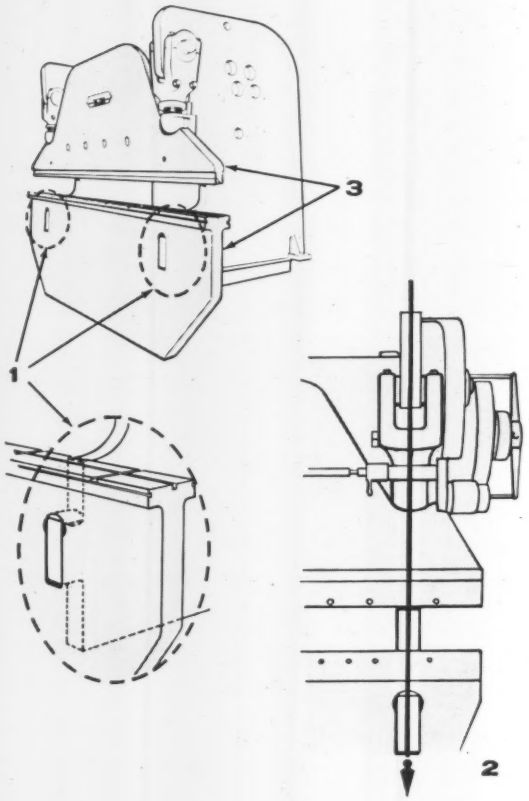
1. Interlocked construction—The bed is supported directly by the housings, by means of hand-scraped bearing shoes. No welds are used as load supports, so every Cincinnati is free from welding strains.

2. Center line loading—Since the Pitmans which drive the ram *straddle* the housings, weaving of the frame and cramping of the ram slides and shaft bearings is eliminated. All operating forces are contained within the housings.

3. Deep beds and rams—It's a simple engineering fact that the rigidity of a press brake's ram and bed increases approximately as the cube of the depth. For this reason, most of the weight of the ram and bed of a Cincinnati Press Brake is disposed in depth, rather than thickness. Tests prove their working surfaces remain parallel within .005″ under capacity loads.

To you these construction features mean money saved in the long run. A Cincinnati Press Brake is more accurate than other makes when you buy it . . . and will stay that way throughout its long life.

Write department C for Catalog B-5.



Shapers / Shears / Press Brakes

THE **CINCINNATI SHAPER** CO.

Cincinnati 11, Ohio

"they build the biggest variety of exchangers and condensers in the business"

Companies large and small throw a volley of heat transfer curves at Ross and get time-saving, cost-cutting answers. Operating on a "you name it, we'll do it" basis, Ross has designed and built practically every type and size of heat exchange equipment in use today.

By putting top engineering brains to work on routine as well as highly specialized assignments, Ross has racked up a string of "firsts" that date back to 1917.

Today, with a large new plant in operation, this team of specialists is ready to custom build or mass produce *on a greater scale than ever before.* A division of American-Standard*, Ross Heat Exchanger is geared to deliver the goods, from miniature oil coolers to mammoth field-erected surface condensers.

The next time you've got a heat transfer problem, put it up to Ross early in the game. Meanwhile, get a closer look at Ross men, facilities and products. Write for new illustrated booklet "THIS IS ROSS — READY FOR YOU."

American-Standard, Ross Heat Exchanger Division, Buffalo 5, N. Y. In Canada: American-Standard Products (Canada) Ltd., Station D, Toronto, Ont.

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American-Standard Products

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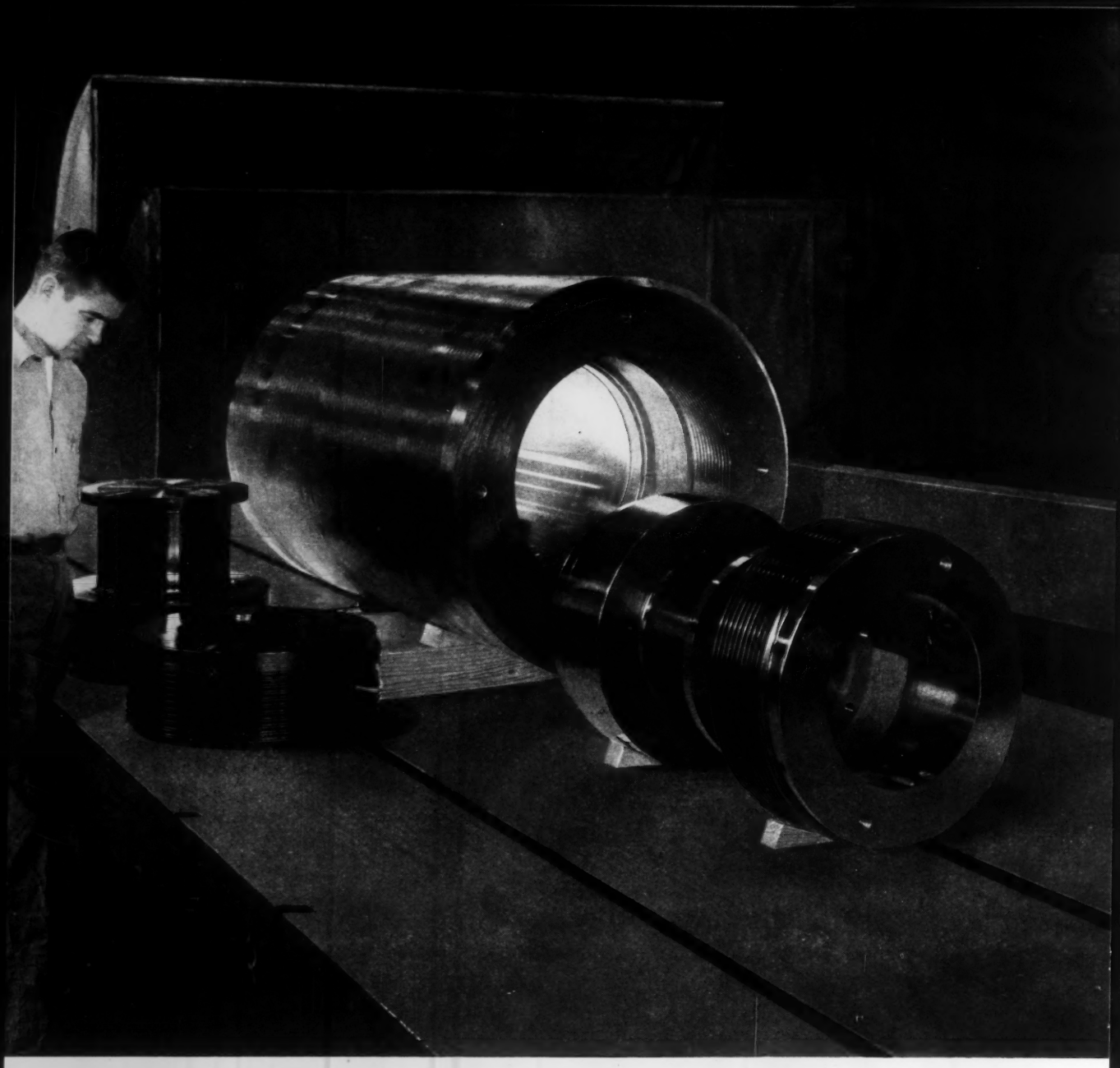
ROSS HEAT EXCHANGER DIVISION



WHO FORGES THE TOUGH ONES? & machines them, too

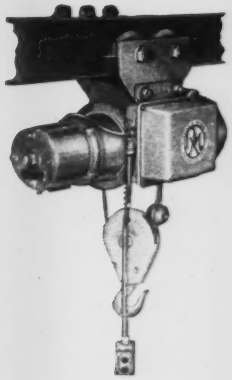
Assume that you've just designed a high pressure cylinder to be used in the production of high energy explosives. It is a good sized forging—the main cylinder is 50¼" long, 31½" O.D., and 18" I.D.—with high physicals. It must be forged of a highly alloyed chromium nickel molybdenum vanadium steel to obtain a tensile of 164,000 psi . . . a yield point of 153,000 lbs. . . . and hydrostatic test at 30,000 psi.

Naturally, you prefer one responsible source to do the whole job—one organization to melt the steel, forge, and finish all parts to exact prescribed tolerances.

So, call on National Forge, a company that's been producing big forgings for over 40 years—from melting steel through finish machining and protective coating (dulite, in this case) all in one completely integrated plant. Let us quote on your next job for big machined forgings—and demonstrate the answer to "who forges and machines the tough ones . . . best?"

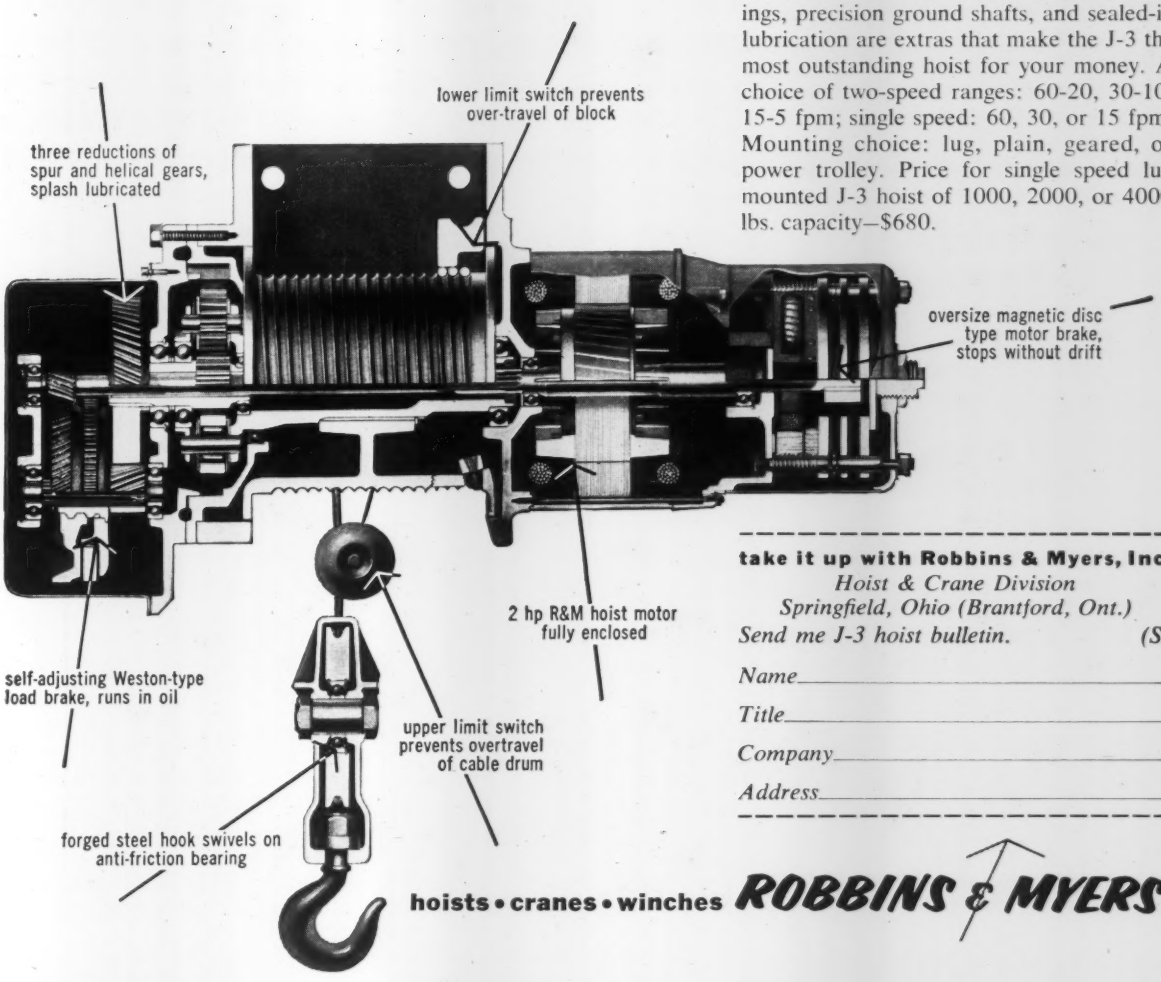
NATIONAL FORGE & ORDNANCE COMPANY
IRVINE, WARREN COUNTY, PA.

For more information on "the tough ones," and the machinery that makes them "best"—write for Bulletin NFO-3.



too much hoist?

R&M J-3 hoists have specific points of superiority that go beyond what hoist users usually consider "adequate." The 2 hp R&M high torque hoist motor, designed and built for full-time, full-load hoist duty, has the highest motor rating found in any standard hoist (30 min., 55 degrees C.), giving it ample reserve for accidental overloads. Power is transmitted through three reductions of cut helical and spur gears, instead of the usual two. Oversize ball bearings, precision ground shafts, and sealed-in lubrication are extras that make the J-3 the most outstanding hoist for your money. A choice of two-speed ranges: 60-20, 30-10, 15-5 fpm; single speed: 60, 30, or 15 fpm. Mounting choice: lug, plain, geared, or power trolley. Price for single speed lug mounted J-3 hoist of 1000, 2000, or 4000 lbs. capacity—$680.


lower limit switch prevents over-travel of block
three reductions of spur and helical gears, splash lubricated
oversize magnetic disc type motor brake, stops without drift
2 hp R&M hoist motor fully enclosed
self-adjusting Weston-type load brake, runs in oil
upper limit switch prevents overtravel of cable drum
forged steel hook swivels on anti-friction bearing

take it up with Robbins & Myers, Inc.
Hoist & Crane Division
Springfield, Ohio (Brantford, Ont.)
Send me J-3 hoist bulletin. *(S)*

*Name*_____

*Title*_____

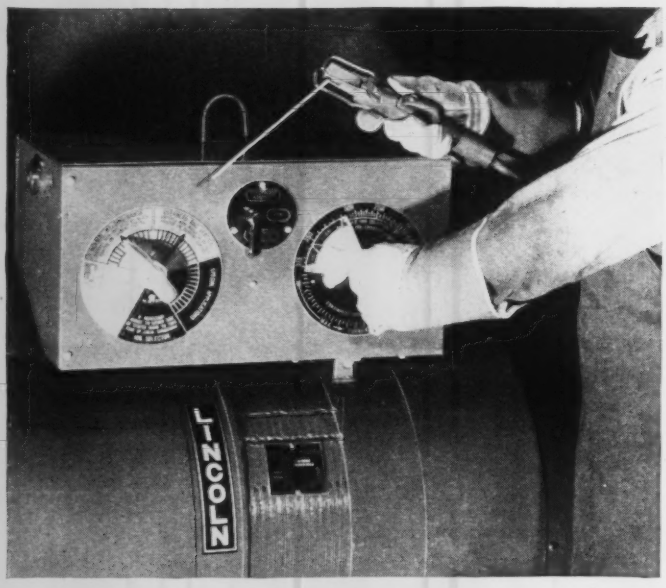
*Company*_____

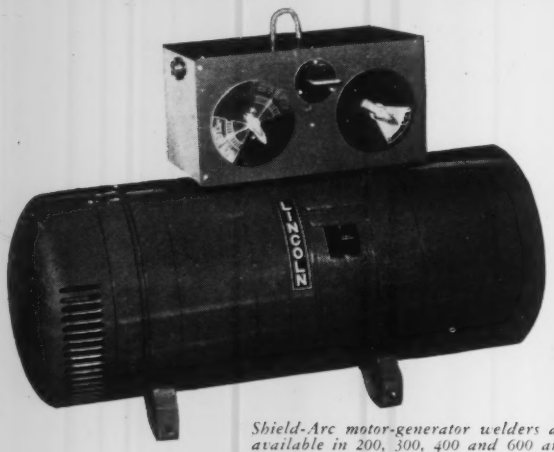
*Address*_____

hoists • cranes • winches **ROBBINS & MYERS**

Weldynamics

ARC WELDING AT WORK CUTTING COSTS





Shield-Arc motor-generator welders are available in 200, 300, 400 and 600 amp sizes; portable or stationary; for AC or DC power supply. Specifications and engineering data are contained in Bulletin SB-1362. Sent on request.

In Your Shop you can take advantage of Weldynamics by providing your weldors with the most efficient equipment.

Lincoln Shield-Arc Motor-Generator Welders are Weldynamically designed for fast, easy welding under any conditions.

Dual Continuous Controls allow the weldor to select the kind of arc he likes to work with. He uses the current control to select the welding heat, and the voltage control to select arc "snappiness" and to fine-tune the welding heat.

Nearly Every Weldor is familiar with Lincoln Shield-Arc Welders, and most weldors prefer them.

Lincoln Applies Weldynamics in its own plant to cut manufacturing costs. These savings are passed on to you in better welding products for less cost.

Lincoln Representatives are trained in Weldynamics. They are equipped to help you with procedures, equipment and design. A letter or phone call is all it takes.

The World's Largest Manufacturer of Arc Welding Equipment

LINCOLN®

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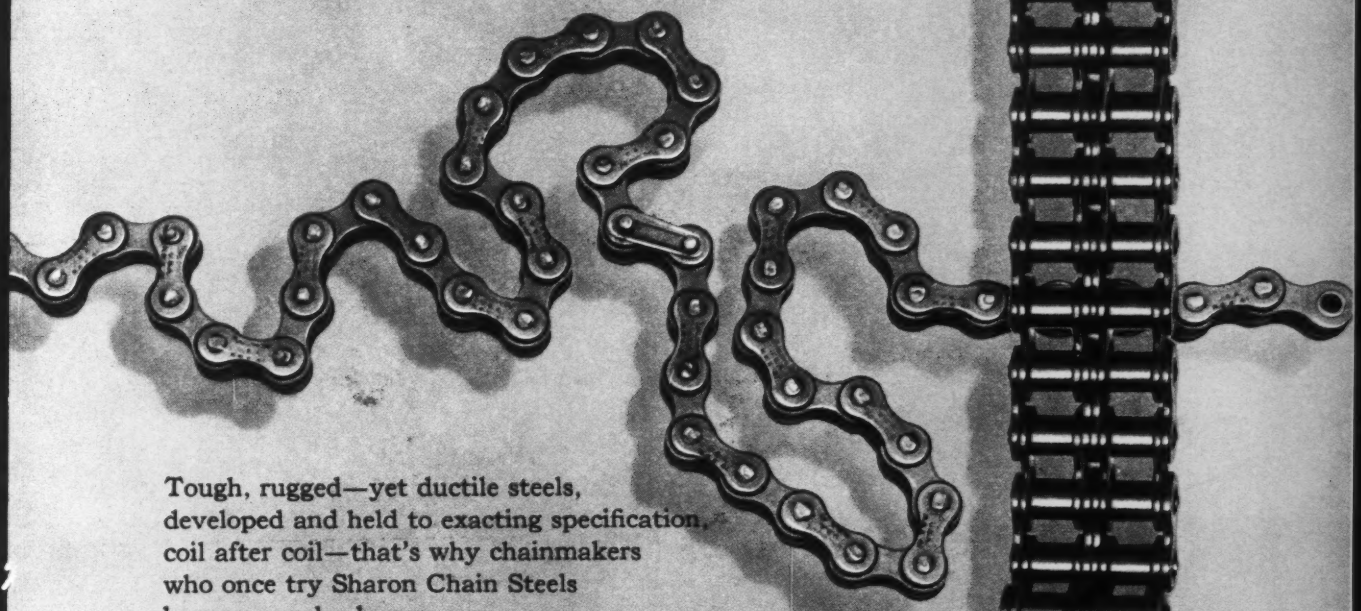
THE LINCOLN ELECTRIC COMPANY • DEPT. 1637 • CLEVELAND 17, OHIO

Better Chains...

BEGIN WITH

SHARON QUALITY

CHAIN STEELS



Tough, rugged—yet ductile steels, developed and held to exacting specification, coil after coil—that's why chainmakers who once try Sharon Chain Steels become regular buyers.

If you are in the business of making chain, why not talk to Sharon metallurgists and take advantage of the first-hand knowledge of chain steels that comes from years of developing special alloys for the chain industry.

SHARONSTEEL

SHARON STEEL CORP.

SHARON, PENNSYLVANIA

NEW GULFCUT

HEAVY DUTY SOLUBLE OIL

for heavier cuts—at higher speeds—with longer tool life—even in turning chrome-nickel steels and other tough alloys!

Here are some of the first reports from the field on the performance of Gulfcut Heavy Duty Soluble Cutting Oil:

- "We grind twice as many pieces before wheel dressing!"
- "We were able to substantially increase depth of cut."
- "We get tolerances of 6 microns, instead of 16!"
- "We have been able to increase boring speeds!"

GULFCUT HEAVY DUTY SOLUBLE OIL

increases the efficiency of a wide range of machining and grinding operations...because:

1. Its lubricating-cooling-protective properties meet the heavy duty machining needs of today.

2. It permits higher speeds, deeper cuts . . . gives finer finishes, longer tool life . . . offers greater protection against corrosion . . . helps eliminate rancidity!

3. It performs efficiently even when mixed 1 to 150 parts of water . . . and has exceptionally long service life!

This new Gulf product is a heavy duty soluble cutting oil with a petro-chemical emulsifier. Its applications include heavy hogging cuts, fast fine cuts, boring, and grinding of ferrous materials, tough alloys—such as titanium and chrome-nickel-moly steels—and soft, non-ferrous metals, such as aluminum.

Shop-proved Gulfcut Heavy Duty Soluble Oil won't separate or gum in wheels, slides or ways. It contains a potent rust inhibitor which provides greater protection against rust and corrosion. It has excellent emulsion stability even in hardest water. It has high surface-wetting properties for more effective cooling. It is anti-weld, anti-wear and anti-foam. Also contains an effective germicide to help eliminate rancidity and odor.

Get the full efficiency-economy story on new Gulfcut Heavy Duty Soluble Oil now! Call your Gulf Sales Engineer, at your nearest Gulf office, or mail the coupon.

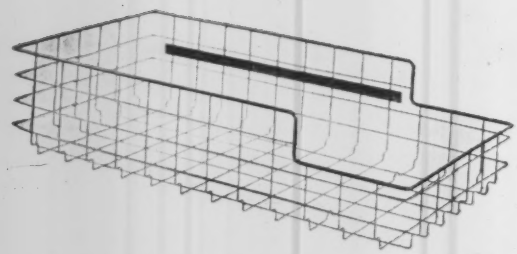
THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

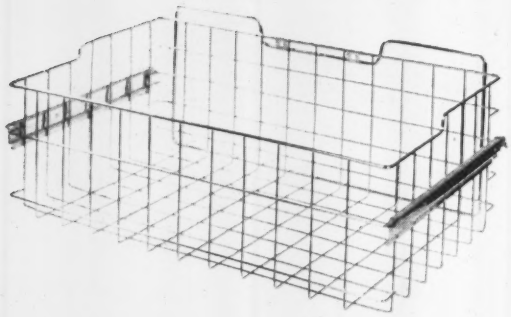
GULF

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

Yes! Send me illustrated bulletin on
☐ Gulfcut Heavy Duty Soluble Oil
☐ Gulfcut "Regular" Cutting Oils

Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zone____





YOUNGSTOWN EXTRA SMOOTH CLEAN BRIGHT BASIC WIRE

Plus Automated Fabrication Techniques Gives High Quality Production to *Bauer* Brothers

Over 75 years of production know-how combined with an excellent background of engineering experience enables the Bauer Brothers Co. of Springfield, Ohio, to provide their customers with economical, intelligent, up-to-the-minute wire product designs.

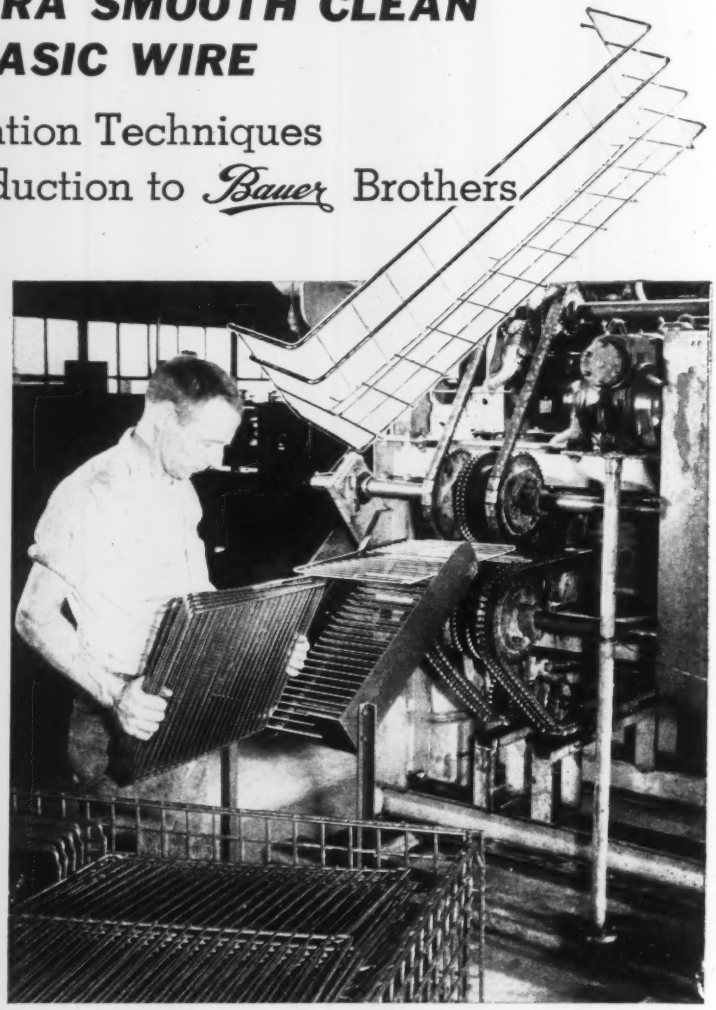
Using the latest techniques in "automation", this progressive fabricator relys on Youngstown's Extra Smooth Clean Bright Basic Industrial Quality Wire to keep both their production and product quality at a high level. They find it forms easily—while still providing the necessary rigidity and strength required in their finished products.

Its surface is free from all oil, dirt and grease which enables plating that's permanent—won't flake off. Also, it spot-welds fast and sure for permanent, strong construction. Why not make it your continuing specification for increased production and profits.

All Youngstown Wire is quality-controlled through each integrated operation from ore mining to final drawing. Thus, you can be sure there will be no injurious seams and piping, laps, die marks or internal tearing and cupping to hold up your production lines.

For additional information or metallurgical assistance, write or phone your nearest Youngstown District Sales Office today.

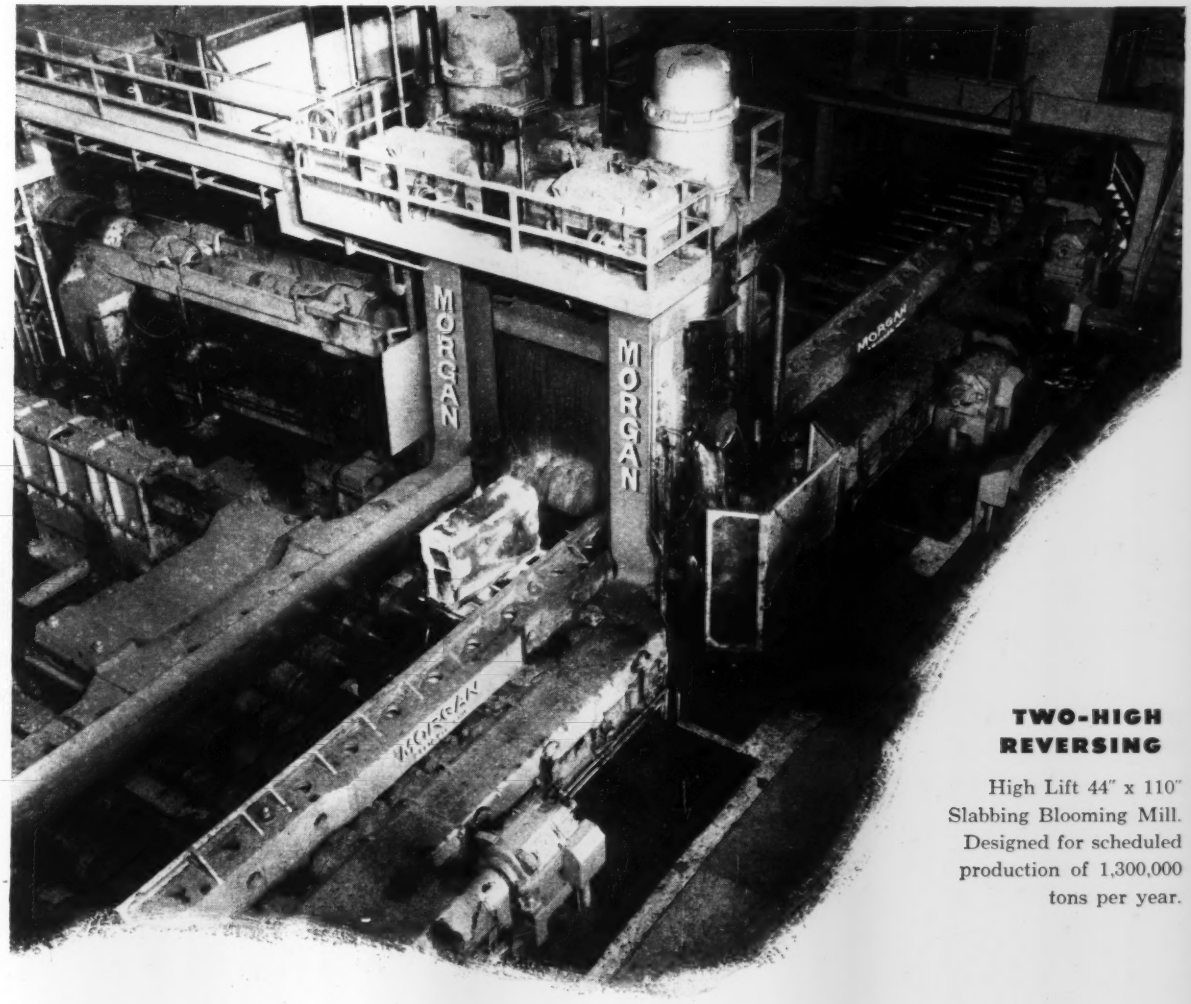
QUALITY YOUNGSTOWN SERVICE



Bauer's "Flying Dutchman" using Youngstown Extra Smooth Clean Bright Basic Wire automatically fabricates a frame into a finished shelf in only 60 seconds.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities



TWO-HIGH REVERSING

High Lift 44" x 110" Slabbing Blooming Mill. Designed for scheduled production of 1,300,000 tons per year.

HOW WOULD YOU WEIGH A ROLLING MILL?

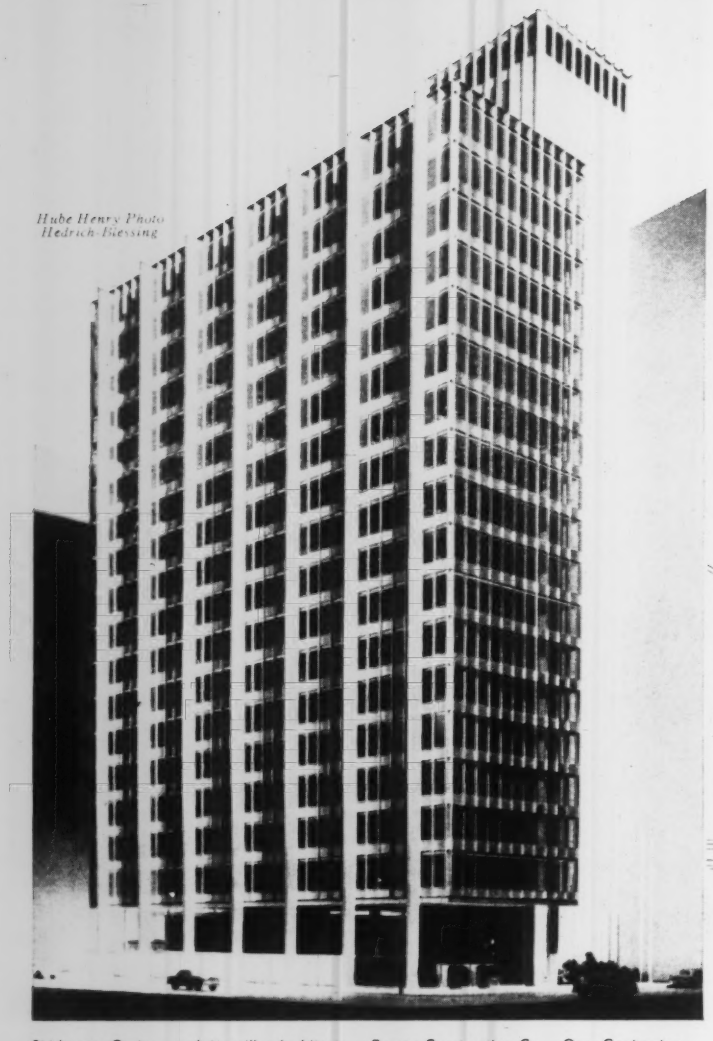
Efficient, profitable operations in a steel mill depend in large measure on continuous-flow production. Bonus capacity and *unquestionable dependability* tip the scale in favor of slabbing and blooming mills designed and built by The Morgan Engineering Company.

You weigh the cost of "the big stuff" in terms of uninterrupted production. Every part of a giant rolling mill must be engineered for *assured* performance . . . built to face up to the toughest jobs the industry will ask of it.

The Morgan Engineering Company has been known for advanced design and trusted craftsmanship for ninety years. Close contact with the ever-increasing needs of metal producers has resulted in greater speed, capacity and efficiency; lower operating and maintenance costs wherever you see the nameplate MORGAN . . . Alliance, Ohio.

THE MORGAN ENGINEERING CO. *Alliance, Ohio*

Overhead electric traveling cranes, gantry cranes, open hearth special cranes, plate mills, blooming mills, structural mills, shears, saws and auxiliary equipment.



Hube Henry Photo
Hedrich-Blessing

FIRST BUILDING

TO USE THE

NICKEL-SAVING

ALLEGHENY-PIONEERED

STAINLESS STEEL (TYPE 202)

Skidmore, Owings and Merrill—*Architects*... Turner Construction Co.—*Gen. Contractor*

The Inland Steel Company's new headquarters in Chicago numbers some important firsts among its outstanding features. It is the first large office building to be built in Chicago's loop in 20 years. It is also Chicago's first stainless curtain wall building, and the first building anywhere to use the low-nickel stainless grades pioneered by Allegheny Ludlum.

Allegheny 200-series stainless steels (Types 201 and 202) are the answer to one of the knottiest problems that have faced architects and designers who want to use the superior durability, strength and beauty inherent in stainless steel. Now, with the 200-series it is possible to think in terms of stainless steel without fear of future shortages. That is always an important consideration, and especially so with mass-produced items.

In most applications the 200-series perform as well as the 300-series of stainless steels, and they offer unique advantages of their own. There is some advantage in price, strength is slightly higher and availability is much greater in times of nickel shortage. Weldability, forming and finishing characteristics are virtually the same as with the 300-series.

If these new steels sound interesting to you, let us supply printed information and engineering assistance. ● Write for a copy of *Technical Horizons No. TH2*, containing essential data on the properties and characteristics of Allegheny 200-series low nickel stainless steels. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.***

ADDRESS DEPT. S-3

WSW 6677 A

Make it BETTER and LONGER LASTING with Stainless from

ALLEGHENY LUDLUM

Warehouse stocks carried by all Ryerson steel plants

Mr. W. J. McCuen says: "Lint-free Scott Wipers are ideal for wiping glassware in our lab. They're soft enough for personal wiping—hands and faces—and yet tough enough for such jobs as wiping switchgear units, wiping machine shop lathes, wiping heavy gate valves, and cleaning paint brushes!" Perf-embossed Scott Wipers are also specially treated for extra wet strength.

People buy Scott Wipers for many reasons:

Sinclair reduces minor injuries, saves time, with Scott Wipers!

At Sinclair Refining Company, Marcus Hook, Pennsylvania, 2-ply paper Scott Wipers are used throughout the plant. They store easily in minimum space, eliminate the costs of "return and exchange," and please employees. But a big factor, in the eyes of management, is *employee safety*. Mr. W. J. McCuen, Assistant General Foreman—Storehouse, reports: "These disposable wipers have cut down on minor injuries and lost time. Employees can't cut themselves on clinging chips or foreign particles, using Scott Wipers fresh from the box!" Sinclair has seen a substantial savings in wiping material costs, too . . . with paper wipers reducing (and in some departments eliminating) the number of cloth wipers being used!

SCOTT PAPER

Get complete facts and figures on Sinclair as well as other case histories close to your own type of operations! Just call your Scott distributor—in the Yellow Pages under "Paper Towels." Or write: Scott Paper Company, Dept. S-83, Chester, Pennsylvania.

Maker of the famous Scott paper products you use in your home. See "Father Knows Best" and "The Gisele MacKenzie Show" on NBC-TV.

Something new... made better by aluminum

Super-purity aluminum has helped set a new standard in gasoline performance . . . new standards in metal brilliance and workability.

From high-power gasoline to high-fashion jewelry . . . super-purity Aluminum is making news

The new third pump in filling stations across the continent is one more symbol of aluminum's amazing versatility. For these higher octane gasolines are produced by a new catalyst—made possible by super-purity (99.99+%) aluminum. And Canada's Aluminium Limited, alone, supplies two thirds of this super-purity metal used by the North American oil refining industry.

In Metalworking too

Super-purity aluminum is also being used more and more in quality metalworking. For no other metal of such easy workability can be polished to such a brilliant and long-lasting lustre. This unique combination of properties has proven invaluable to makers of reflectors, jewelry, tableware, and decorative trim for higher priced automobiles and modern buildings.

Canada a logical source

To produce super-purity aluminum requires twice as much electric power as the commercial grade. That's why Aluminium Limited with its vast hydroelectric installations in Quebec and British Columbia is such a logical source. Once again this independent Canadian producer's natural role as a supplier of primary aluminum is serving the skills of American fabricators to create new products made better by aluminum.

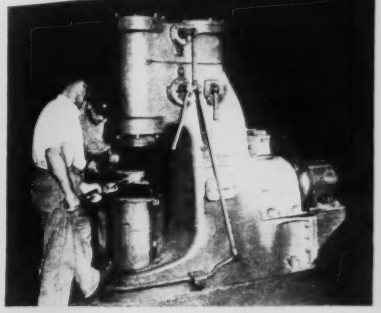
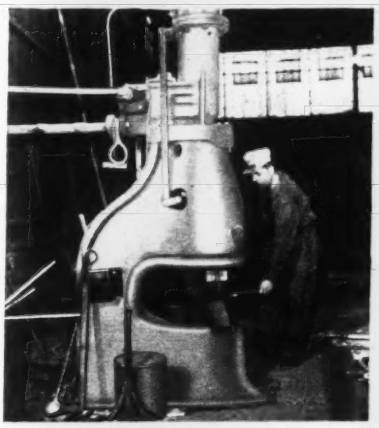
Supplying U. S. industries with primary aluminum from Canada

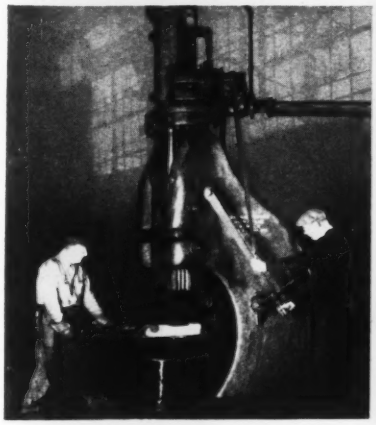
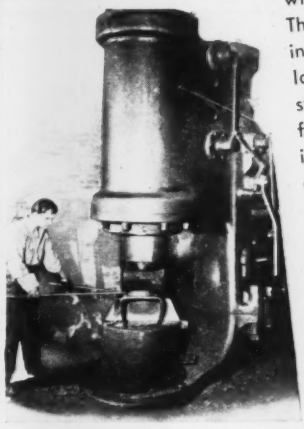
Aluminium Limited *Sales, Inc.*

630 FIFTH AVENUE • NEW YORK 20, N. Y.

CLEVELAND • CHICAGO • LOS ANGELES • DETROIT • ATLANTA • BUENOS AIRES • SÃO PAULO

For Flat Die Forging, Blacksmithing, or Tool Dressing

CALL it what you will, you have the choice of two superior hammers: the Chambersburg High Frame Hammer, operating on steam or air; and the Chambersburg Motor Driven Pneumatic Forging Hammer, which can operate anywhere, independent of steam or air lines. The High Frame Hammer has ample working space, adaptable to the forging of large discs and rings, the upsetting of high stems, etc., and has many other outstanding features. The Pneumatic Forging Hammer is completely self-contained, with its motor driven compressor built-in. It is capable of greater forging output than any other hammer of its type.

Either or both hammers, whether it be a 100 lb., a 750 lb. or a giant 6000 lb., will represent a profitable investment for your flat die, blacksmithing or tool dressing needs. Write today for Bulletins 1-L-4 and 16-L-6.

CHAMBERSBURG ENGINEERING COMPANY . . . . . CHAMBERSBURG, PA.

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THE HAMMER BUILDERS

CECOJDROP

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BOARD DROP
AUTOMATIC FORGING

THE IMPACTER

FLAT DIE SINGLE FRAME

FLAT DIE DOUBLE FRAME

PNEUMATIC SELF-CONTAINED

TRIMMING PRESS

Ambrose-Augusterfer Corporation has been awarded the contract for all major piping in Torresdale Filter Plant —now under construction in N.E. Philadelphia. Pipe being handled weighs over 10,000 lbs. and measures 40′ by 54″ in diameter.

Only Yale G-3 Gas

1. Wide Angle vision
2. Fast cycle operation
3. Greater load stability

Now full visibility, extra safety and handling speed for efficient, big-load operations...at low cost

Raw materials or finished goods —versatile Yale high-capacity Gas Trucks handle any type load with extra speed, safety and efficiency.

Trucks give you all 3

Maximum visibility, easy maneuverability, high speeds, safe stability—you'll find the combination of all these vital features exclusively in new Yale G-3 Series High-Capacity Gas Trucks.

Wide-Angle Vision—Yale's revolutionary open-front design reduces frontal obstruction. Upright channels are nested—hoisting cylinders wide-spaced—lifting chains located in front of cylinders, out of line of sight. Driver sits high in center—has 300% more visibility!

Fast Cycle Operation—Yale G-3 Gas Trucks maneuver quickly into position ...lift capacity loads at speeds up to 60 feet a minute...travel as fast as 20 m.p.h....spot loads accurately. This fast, smooth operation keeps materials on the move, saves time and handling dollars.

Greater Stability—Low center of gravity, broad lifting base, high underclearance, side-thrust rollers, wide channel-roller spacing, large pneumatic tires—these and many other features that assure load stability are *standard* on Yale High-Capacity Gas Trucks.

Yale G-3 Gas and LP-Gas Trucks come in capacities of 15,000 to 20,000 lbs.—with fully automatic torque transmission, fluid coupling or standard transmission. Complete line available in capacities of 2,000 to 20,000 lbs.

Get the full story. Send for your free copy of Bulletin #5230. The Yale & Towne Mfg. Co., Philadelphia 15, Pa., Dept. A-83

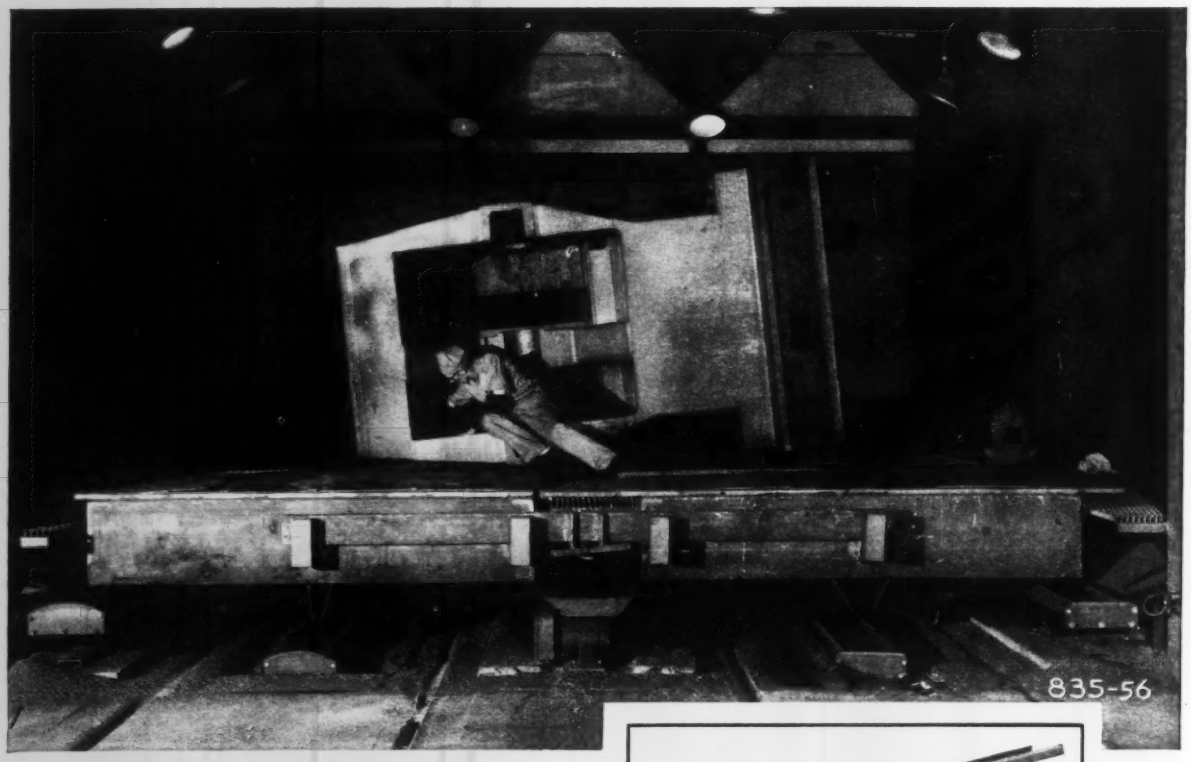
YALE* *REG. U.S. PAT. OFF.

INDUSTRIAL LIFT TRUCKS AND HOISTS

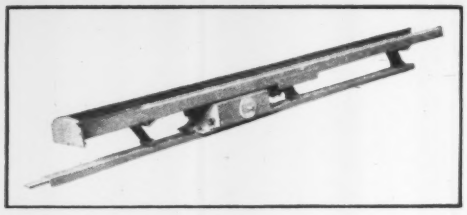
YALE & TOWNE

GASOLINE, ELECTRIC, DIESEL & LP-GAS INDUSTRIAL LIFT TRUCKS • WORKSAVERS
WAREHOUSERS • HAND TRUCKS • HAND AND ELECTRIC HOISTS

YALE MATERIALS HANDLING DIVISION, THE YALE & TOWNE MANUFACTURING CO. MANUFACTURING PLANTS: PHILADELPHIA, PA.; SAN LEANDRO, CALIF.; FORREST CITY, ARK.



SHOT BLAST ROOM at E. W. Bliss Company, Canton, Ohio. Jeffrey LMV Conveyors, furnished through Northeastern Supply Company, gather shot and carry it back to screens and pressure tank for re-use.



Another good spot for time-saving, cost-saving

JEFFREY LMV CONVEYORS

In all kinds of plants, the handling of light materials can be speeded up, made simpler, more efficient and economical . . . with right-from-distributor-stock Jeffrey LMV Conveyors. Compact LMV mechanical vibrating units are quickly custom-sized for your installation . . . ready for next-day delivery and easy for plant personnel to install.

In shot blast room above, five 12″ x 25′ 3″ LMV units beneath roll-in platform automatically gather shot. A 26′ 3″ unit along the back carries it to screens and pressure tank for re-use.

Jeffrey LMV Conveyors are inexpensive, built for round-the-clock service and quiet in operation. They provide efficient, automatic handling of all types of light materials . . . give long trouble-free service. Get complete information from your distributor or write The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT . . . TRANSMISSION MACHINERY . . . CONTRACT MANUFACTURING

An improved
Combination Starter
for extra safety

While the changes in the new Allen-Bradley Bulletin 712 and Bulletin 713 starters may be relatively minor, they were made in your interest—to give you the best control on the market.

The new operating lever has been attractively restyled and structurally improved. Now the disconnect switch can be locked "open" or locked "closed"—with three padlocks of any kind. For the maintenance engineer, a concealed latch pin is built into the lever, which permits opening the door of the cabinet without opening the disconnect switch and stopping the motor. The door can also be padlocked shut independently of the operating lever.

With the disconnect lever in the "off" position, the cabinet door can be opened. At a glance, it can be seen that the movable contacts are open. An added "safety" feature—the incoming line connections are covered with an insulating plate to prevent accidental contact.

ALLEN-BRADLEY

MOTOR CONTROL

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

BULLETIN 712—These modern A-B combination starters cost no more than a separate starter and disconnect switch, and make a neater, safer, more attractive installation.

Size 1—to 7½ hp, 220 v; 10 hp, 440-550 v.

Size 2—to 15 hp, 220 v; 25 hp, 440-550 v.

Size 3—to 30 hp, 220 v; 50 hp, 440-550 v.

Size 4—to 50 hp, 220 v; 100 hp, 440-550 v.

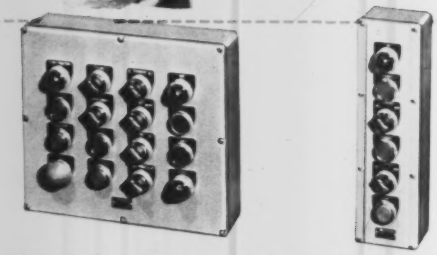
3-58-MR

Not only the Motor Starters, but the Accessories must be "Quality," too!

A-B QUALITY

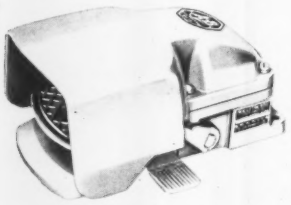
we specify ALLEN-BRADLEY ...all the way

"Trouble" that shows up in a motor starter is often traced to a faulty operating auxiliary—such as a limit switch or even a push button station. Allen-Bradley builds the same high quality into its many accessories as it does into its motor starters—to give you millions of trouble free operations. They are also tested as thoroughly. Contacts are usually double break and always are of a silver alloy, which means they remain in perfect operating condition. It will pay you, too, to specify Allen-Bradley *Quality* control—"all the way!"

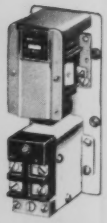


Bulletin 800T Oiltight Control Stations. Available in from one to sixteen units, in die cast aluminum enclosures.

Bulletin 802 Precision Limit Switch, with oil-tight head and body.

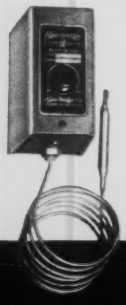


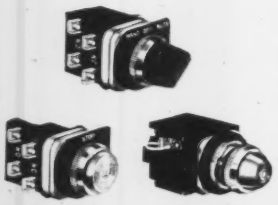
Bulletin 805 Foot Switch. In rugged die cast enclosure for the toughest service.



Bulletin 849 Pneumatic Timer. Reliable and accurate.

Bulletin 837 Temperature Control with snap action, precision switch.





Bulletin 800T Oiltight Push Button, Selector Switch, and Press-to-Test Pilot Light.

Bulletin 800 Standard Duty Push Button. One, two, and three buttons; also as selector switch.

Bulletin 836 Pressure Control in NEMA 4 watertight enclosure.

3-58-MR

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

Why SHOULDN'T I be interested in business life insurance?

"Our future depends on the future of my husband's business."

Every businessman — owner, partner, stockholder — has a vital stake in the future of his business . . . and his family may face real hardship *unless* he has prevented possible financial disaster through sound business planning.

One of the greatest hazards can be death of an owner of the business. Ætna Life's Business Planning Service can be instrumental in protecting your family's future security when this happens.

Thoroughly trained representatives in 91 agencies from coast to coast offer you and your attorneys this essential planning service.

ÆTNA BUSINESS LIFE INSURANCE PLANS ARE SPECIALLY DESIGNED . . .

- To preserve **PARTNERSHIP** value when death comes to any partner.
- To preserve **SOLE PROPRIETORSHIPS** for heirs or selected employees.
- To preserve ownership values when death comes to any stockholder in a **CLOSE CORPORATION.**
- To indemnify any firm for the death of a **KEY MAN.**

Add Life to your Business with Ætna Business Life Insurance

ÆTNA LIFE
INSURANCE COMPANY

Affiliates:

ÆTNA CASUALTY AND SURETY COMPANY
STANDARD FIRE INSURANCE COMPANY
Hartford, Conn.

Ætna Life Insurance Company
Hartford 15, Connecticut

Gentlemen:

Please send me a copy of your new business life insurance booklet "Will This Man Take Your Business With Him When He Dies?"

Name_____

Address_____

_____

Drilling mud, containing sand and rock particles, looks like this as it flows from a well hole. It is "freshened up" for re-use in a cleaning machine equipped with a wear-resisting Monel alloy screen. *Photo courtesy Standard Oil Company, (New Jersey).*

It's murder on most metals

when mud goes to the cleaners

The idea of putting mud through a cleaning process may seem fantastic. But that's exactly what they do in the oilfields.

Drillers use special chemically treated mud to cool high-speed bits, and to bring up loose sand and rock particles.

That sand-rock-mud mixture is a murderous combination, an abrasive compound that no one recommends for continued use with expensive equipment.

So into a cleaning machine goes the mud! That's easier – and cheaper – than getting new mud. And just as good. All those bits of sharp and destructive rock are trapped inside a revolving cylinder made of Monel* nickel-copper alloy screen.

Monel alloy has the strength and toughness needed to resist this wear and abrasion. It also withstands corrosion by the chemicals in the mud, and the acid used in cleaning the machine. It's the kind of metal that takes problem jobs in stride.

Do you have a problem job, too? Write for a copy of "Standard Alloys." Contains answers to problems of corrosion, abrasion, high temperatures, fatigue.

*Registered trademark

Remember, when you buy

INCO NICKEL . . . you also get

INCO + SERVICES

Whenever you are looking for answers to your metal problems, all the information and help we can give you are yours for the asking. For instance . . .

- + Corrosion Service
- + High Temperature Service
- + Fabrication Help
- + Foundry Service
- + Field Information Centers
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The International Nickel Company, Inc.
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INCO NICKEL ALLOYS

NICKEL ALLOYS PERFORM BETTER LONGER

Is UAW Wavering?

United Auto Worker President Walter Reuther talks tough, but the tone in the ranks isn't so militant. Leonard Woodcock, UAW-GM director, speaks of "minimal" demands, soft-pedals profit sharing, and keeps emphasizing the need for "realism." A Pontiac local, meeting about speedup issues, refused to vote strike action. The members generally show no white hot fervor for profit sharing. The popular issues with them: Wages, severance and job transfer rights, a better deal for skilled trades. Either of the first two demands could lead to a strike. Formal bargaining will probably start first with Ford, on Mar. 31. Big Three contracts expire June 1.

Chrysler, Union Drift toward Strike

Chrysler and the UAW may be drifting toward a strike over work standards and hours. But the walkout would not determine the outcome of the big wage-profit sharing demands. A showdown at GM or Ford will decide that. The Chrysler situation has been festering for months. Because the corporation takes 7 to 14 more manhours than Ford or GM to produce a car, Chrysler management has been trying to tighten up. The union resists—by scattered strikes up to now, but it might try a company-wide walkout.

Aircraft Demands Unveiled

Bulk of the aircraft negotiations take place this month and next. UAW gives a clue to what it will demand with its proposals to Chance Vought Aircraft Inc.'s Grand Prairie, Tex., management. It wants 23 cents an hour, although 13 of that would be a catchup on escalator bonuses paid elsewhere. Other demands: A pay progression system, severance pay, one more holiday, fewer job classes.

Jobless Pay System Faces Test

Look for the nation's unemployment compensation system to face its severest test in the first half. The strain is not that the funds will run out. America's unemployment reserves now stand at $8.6 billion, so depletion at the rate of $250 million a month during the first half will be no problem. The 2.9 million insured unemployed cost the benefit system an estimated $285 million last month. Even if those sums rise, the dent in reserves won't be disastrous. But Congress or the administration could throw the system out of kilter. One bill, sponsored by Sen. John Kennedy (D., Mass.) and Rep. Eugene McCarthy (D., Minn.), would set federal minimums and extend the length of payments.

High Cost of Union Membership

Belonging to a union is hardly a something-for-nothing deal. Typical monthly dues: Aluminum workers—$2 minimum, $5 maximum; auto workers—$3 minimum, no maximum; electrical workers (IUE)—$3 minimum, no maximum; independent electrical workers—$1.50 minimum, no maximum; machinists—$2 minimum, no maximum; mine, mill, and smelter workers—$2.50 minimum; United Mine Workers—$4.25 minimum, no maxi-

mum; oil, chemical, and atomic workers—$3 minimum, $6 maximum; steelworkers—$5.

Outlook for Missile Business

The big transition from bombers to missiles will not take place until the early 1970s, predicted panelists at an Air Force Association meeting in Washington. In the decade ahead, they think, the changeover will remain far behind our advancing technology. The subsonic Snark will be used in quantity in the '60s, even though IRBMs and ICBMs will be operational in 1959-60. Panelists expect ICBM production to be about at the same pace as current B-52 output. (Six hundred will be built under present contracts, although more will be requested this spring.) They concluded: Missile industry employment will never be as high as that of the old aircraft industry.

New Interest in Beryllium

Even without aircraft structural consumption, normal industrial and nuclear demand for beryllium will increase enough to require 10,500 tons of ore by 1962, two and one-third times the amount used in 1956. That's the prediction of S. A. Feitler, a Bureau of Mines engineer. If aircraft and missile makers take to it, the sky's the limit.

Is Planned Obsolescence Good?

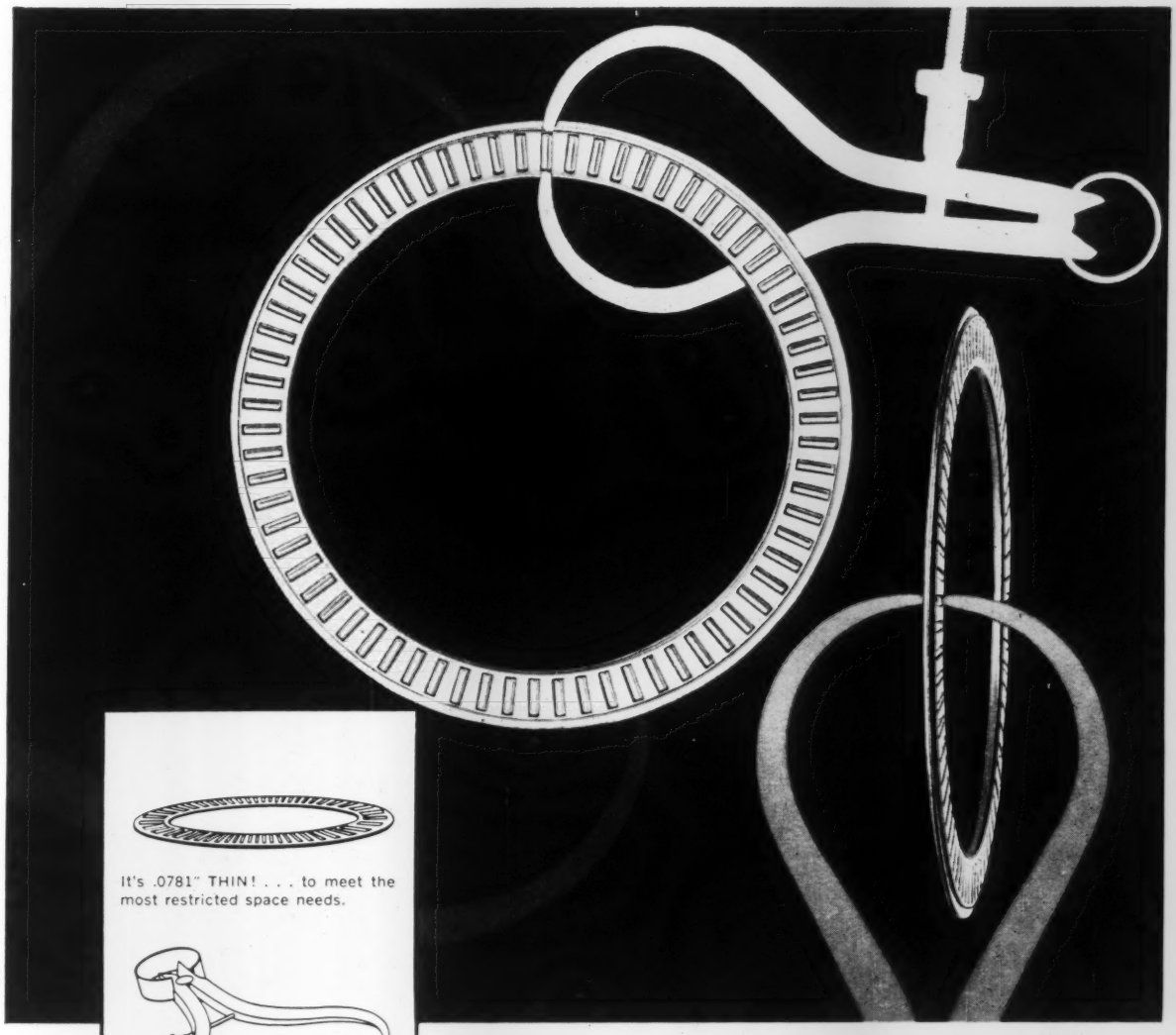
Is planned obsolescence a realistic means of maintaining a dynamic market? No, says Henry Dreyfuss, design engineer. "Planned obsolescence creates panicky, distrustful purchasers," he believes, and it also tends to delude the manufacturer into thinking that change is always improvement. He thinks markets can be made to grow if: 1. We improve product functions. 2. Make throwaway byproducts. 3. Rent, rather than sell, products like housewares. 4. Design byproducts to be supplemented by accessories.

Farm Population Slips

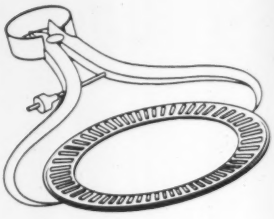
Paste this in your marketing file: The farm population today numbers only about 20 million, or 12 per cent of our total population. In 1910, we had more than 32 million farmers, 35 per cent of our population. One big reason for greater farm productivity: More mechanization. The trend continues.

Straws in the Wind

General Motors Corp. boosted its cost-of-living pay by 3 cents to about 362,000 hourly workers . . . Jones & Laughlin Steel Corp. has exercised its option to acquire a 98-year lease on the iron property of Quebec Cobalt & Exploration Ltd. Cleveland-Cliffs Iron Co. is joining the enterprise as a partner. The property is in the Mt. Wright area of New Quebec, about 180 miles north of Seven Islands . . . The Air Force is developing a solid-fueled intercontinental ballistic missile . . . AFL-CIO's Maritime Trades Department will try to organize some 30,000 nonunion workers in Great Lakes shipping.



It's .0781" THIN! . . . to meet the most restricted space needs.



OD is much smaller, for given shaft size, than other types of thrust bearings.

Needle-proportioned rollers provide large contact area in minimum cross section.

By Every Measure . . . Ideal For Compact Thrust Applications

Whether you gauge its value in compactness, high anti-friction efficiency, high thrust capacity, or low unit cost, you will find the new Torrington Needle Thrust Bearing measures up ideally to your needs.

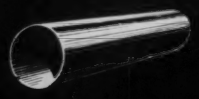
This needle-type bearing is designed specifically for thrust loads in restricted space. It may run directly on adjacent hardened and ground surfaces or on standard thrust races. Used alone, or in combination with Torrington radial type Needle Bearings, the Needle Thrust Bearing finds wide use in many applications including steering gears, hydraulic pumps, tractor bolsters, bevel and worm gear boxes, governors, outboard motors, 2-cycle engines, washing machines, power tools, torque converters, and automatic transmissions.

For engineering information and assistance in design, please call upon the services of Torrington's Engineering Department. **The Torrington Company, Torrington, Conn.—and South Bend 21, Ind.**

TORRINGTON BEARINGS

District Offices and Distributors in Principal Cities of United States and Canada

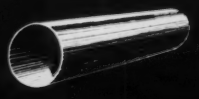
NEEDLE • SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • BALL • NEEDLE ROLLERS • THRUST



Armco ZINCGRIP® STEEL Tubing

Full-weight hot-dip coating of zinc does not flake or peel during severe fabrication. Resists rust.

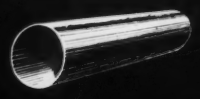
Available in O.D.'s from ⅜-inch to 3 inches; gages from 12 to 20; mechanical or pressure-tested tubing; round, square, rectangular, or special shapes.



Armco ALUMINIZED STEEL Type 1 Tubing

Hot-dip coating of aluminum won't discolor to 900 F—resists destructive heat scaling to 1250 F. Assures top resistance to combinations of heat and corrosion.

Available in O.D.'s from ⅜-inch to 3 inches; gages from 13 to 20; mechanical or pressure-tested tubing; round, square, rectangular, or special shapes.



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Road to Socialism

Walter P. Reuther's plan for sharing profits is being ignored by management on the grounds that it is propaganda. It is being accepted by the public as a way of getting something for nothing.

We think that management should take another look at the proposal.

On Jan. 22, Mr. Reuther told members of the United Automobile Workers Union that he is going after a share-the-profit plan as part of a two-item package. He'll try to sell it to the Big Three on Apr. 1 when negotiations for a new contract open.

Item No. 1 in Mr. Reuther's package calls for higher wages based on increased productivity at full employment, adjustment of wage inequalities among production and skilled workers, 80 per cent takehome pay for laid-off workers, supplemental pay for workers if a plant is on a three-day week, and improved early retirement benefits to create more jobs for young people.

In Item No. 2, Mr. Reuther wants to divide what he calls "an equity in the business." Profits above 10 per cent, before taxes, would be shared three ways: 50 per cent for the company, 25 per cent for the workers, and 25 per cent for the people who bought new cars.

At the end of each year, the workers of each company would decide how to spend their share. Suggestions include: Implementation of the short workweek, expansion of pensions, extra holiday and vacation pay, and cash payment.

Car buyers would get a rebate on their original purchase price at the end of the year.

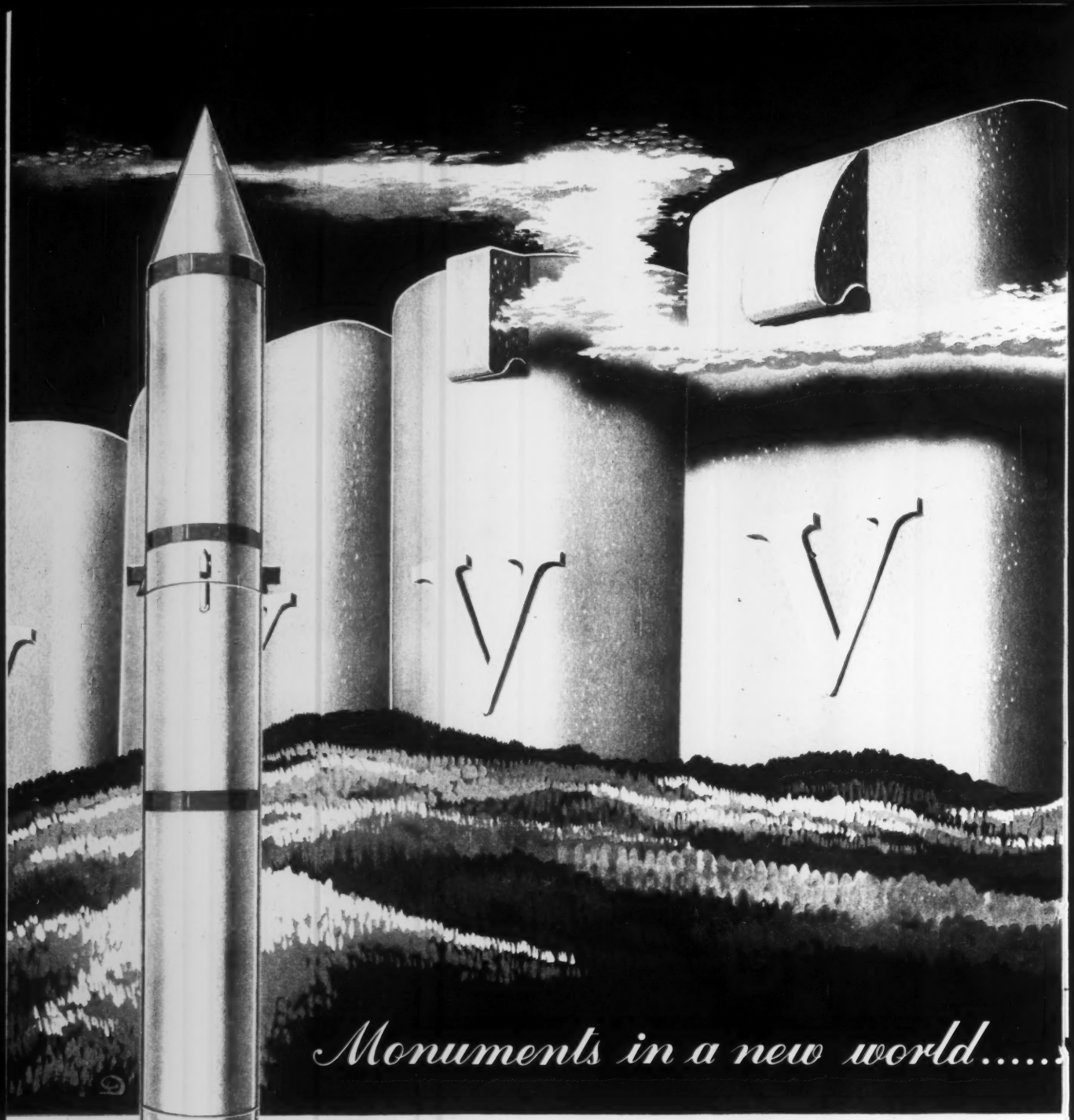
Even if this program is nothing more than a headline grabbing device, management should be alert to the dangers it could lead to. Don't discount its popular appeal, and don't overlook its implications: The plan gives the worker and the general public a larger voice in the management of corporate affairs. Or putting it another way, management is divested of some of its traditional rights.

Regardless of Mr. Reuther's intentions, that's the road to socialism.

The plan should be exposed for what it is right now—before it gets going.

It's up to management to convince the public it won't be getting something for nothing. In fact, it would get something it hadn't figured into the bargain.

Irwin H. Such
EDITOR-IN-CHIEF



Valley ingot moulds are designed for individual steel plant conditions. These moulds meet today's metallurgical requirements

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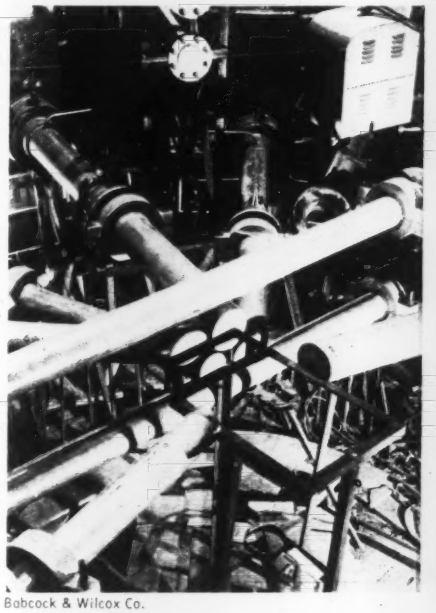


Babcock & Wilcox Co.

A reactor will be submerged in this "swimming pool" at Ann Arbor, Mich.

Outlook for Reactor Components*

(Millions of dollars)

	1961	1964	1968
Fuel handling equipment	$1-$2.5	$2-$6	$2-$9
Pressure vessels	10-13	13.5-22.5	17.5-35
Control apparatus	8-10	10-15.5	12.5-24
Heat exchangers	12.5-16.5	16.5-27	20-39.5
Main pumps	10.5-13.5	13.5-20	16.5-31
Main piping	15.5-18.5	19.5-27.5	24-42.5
Main valves	8.5-10	11-15.5	12.5-23
Tanks & auxiliaries	12-14.5	16.5-22.5	19-32
Instrumentation	6-7.5	8.5-13	9.5-19
Waste handling equipment	5.5-7.5	7-11	8-16

*Estimated delivery value based on 1957 dollars.
Source: Atomic Industrial Forum Inc.

Prospects for Atomics

They're not too good now because slack demand and poor profits plague the industry. Markets for Navy reactors and overseas power units promising

WHEN industry first went "fission," it baited its hook lavishly, sure of a big early catch. But so far only little ones have reached the frying pan: The big ones are still quite a distance upstream.

Everyone agrees the future of the atomic energy market is bright, but short term prospects remain gloomy.

The most encouraging signs are the industry's mounting knowhow and chances for a stepped-up program from a sympathetic Congress.

Troubles—A host of problems need solving before atomicwork really becomes profitable. The chief two are high costs and erratic demand. Says a major power reactor builder: "Unprofitability is largely due to high research and development costs, although in some instances manufacturing expenses have been way over estimates."

Two examples: The original estimate on Consolidated Edison Co.'s Indian Point powerplant was $55 million. Latest reckoning puts the tab closer to $90 million.

Westinghouse Electric Corp. originally thought construction costs for the Shippingport, Pa., reactor wouldn't exceed $37.8 million. Actual cost: $55 million. Research and development expenses ran another $40 million.

Many manufacturers find that reactor costs are running 50 to 90 per cent ahead of estimates. Probable reason is that we're in the "custom-built" stage. Since each reactor is different, the manufacturer has to estimate his R&D costs.

The lack of a formal civilian nuclear program made it hard for companies to gage business prospects. Early optimistic estimates caused many to invest heavily in specialized equipment, facilities, and highly trained employees. But most goals were never fully realized because of sporadic demand.

Chances for Congressional help are growing. Observers at current atomic hearings say the Joint Atomic Energy Committee is ready to push for a formal ten-year building program for power reactors.

One proposal before the committee (from Dr. Chauncey Starr, vice president, North American Aviation Inc.) would let U. S. firms sell power reactors abroad at the cost of a conventional powerplant. The difference would be made up by Uncle Sam. Cost: $200 million annually for ten years.

More Headaches—Six other problems cause metalworking firms varying degrees of trouble.

1. Some complain of excessive government security restrictions. Says one reactor builder: "We have to maintain vaults for classified documents, check-in and check-out systems for the documents, restricted areas, and visitor sign-in and sign-

What AEC Is Spending

(Millions of dollars)

	1957*	1958*	1959*
Raw materials	$397.8	$596.9	$670
Special nuclear materials	581.6	578.6	592
Weapons	323.3	459.1	532.6
Reactor development	266.6	334.8	351
Physical research	59.3	71.5	71.5
Biology & medicine	31.5	37.9	43
Training, education & information	7.8	16.9	18.5
Community	17.8	17.9	15
Program direction & administration	38	44.7	46.6
Security investigations	8.4	8.4	7.0
Other costs	6.6	8.1	6.7
Totals	$1,738.7	$2,174.8	$2,353.9

*Fiscal years.
Source: Atomic Energy Commission.

out systems." Look for simpler security procedures soon.

2. Lack of standardization complicates manufacturing problems. Component makers say they have to modify products for each reactor. That raises prices, lowers profits.

3. Lack of clearcut goals for the program lowers efficiency. At current Congressional hearings, industry representatives emphasized the need for an imaginative, stepped-up program—if for no other reason than U. S. prestige.

4. The field is overcrowded. Example: Six months ago, five companies made fuel elements. Five more are in the business now, and ten others plan to enter. New firms often cut prices because: (a) They don't understand all the problems. (b) They'll take little or no profit to get their foot in the door.

5. Some industry spokesmen warn there will be no speedup in power reactor development until the question of public or private ownership is decided.

6. Because it's so difficult to estimate reactor costs, manufacturers have lost large sums by agreeing to build for a fixed price. The solution, say observers, is to enter into a "cost plus fixed fee" sort of contract. Prediction: Metalworking firms may be able to work out contracts of that type with the government, but civilian customers will say they can't afford it unless Uncle Sam underwrites some of the cost.

Holdup—Metalworking's biggest potential in atomics is power reactor construction. But our large reserves of low cost fossil fuels delay the emergence of an early, large-scale market.

Today's average cost of electric energy from conventional fuels is 7.5 mills per kw-hr. Power from the Shippingport reactor costs 50 to 60 mills per kw-hr. A survey by the Atomic Industrial Forum Inc. (AIF), New York, reveals that even the most optimistic believe it will be 1964 before we have a competitive nuclear powerplant in the U. S. and 1968 before our capacity reaches 6 million kilowatts. The most pessimistic say an economical facility won't appear until after 1968, and that our nuclear capacity then will be only 2 million kilowatts.

Construction expenses for nuclear facilities are higher, too. The cost per kilowatt now is close to $500, vs. $180 to $200 for conventional power. But while construction costs have spiraled (about 115 per cent between 1955-57), AIF survey respondents believe technological gains will reduce expenses 15 to 35 per cent in the 1960-68 period ($430 per electrical kilowatt in 1960, $280 to $360 in 1968).

Prospects—According to the AIF survey, U. S. industry will sell $4 billion worth of reactor equipment and components during the next ten years. Annual dollar volume of sales for large nuclear systems (exclusive of turbogenerator plants and their accessories) will rise from about $300 million in 1960 to $350 million-$660 million in 1968. Propulsion reactors (excluding aircraft) will comprise 40 to 80 per cent of those totals.

Atomic Energy Commission budgets are going up (see table on this page), but only a minor portion of the funds will be translated into metalworking goods.

Overseas—One of the best short term markets for power reactors and components is the Euratom community. AIF estimates that if Euratom operates at 40 per cent of its 1967 goal of 15,000 megawatts, U. S. sales to those countries will total $200 million to $380 million through 1965. Another industry source believes those sales will reach $500 million to $1 billion during the next ten years.

Vitro Corp. of America, New York, pegs the ten-year overseas potential at $3.115 billion. Breakdown: Power reactors and related equipment, $2 billion; propulsion reactors, $1 billion; research reactors, $30 million; radioisotope and radiation applications, $10 million; engineering services, $75 million.

Naval—The brightest area right now is the Navy's atomic submarine program. Profits are fairly good here, and manufacturers report growing repeat orders. AEC spending for naval propulsion ($84 million in fiscal 1958) is expected to spiral. A bill before Congress calls for 100 more nuclear subs.

Construction of nuclear-powered civilian ships should start to boom in a few years. Babcock & Wilcox is working on the powerplant for the first atomic merchant ship, the *Savannah*.

"A high-performance atomic airplane is far in the future," says

Oliver Townsend, AIF's assistant executive manager. But money is being poured into the project: $91 million was alloted in fiscal 1958. This doesn't count Air Force funds spent on the nuclear bomber. Work should start soon on a space vehicle.

Profitability—Probably the most profitable operations are where atomic products can be built on present production lines, or where they are in the producer's conventional line. Example: Calumet & Hecla Inc.'s Wolverine Tube Div., Detroit, makes integral thin tubing for nuclear heat exchangers. Profits from atomic orders are comparable to those from other consuming industries, says the company.

Also remunerative are certain areas of atomic energy outside the reactor field. Examples: Processing radioactive isotopes is reportedly profitable. Though the market is still small, chances for growth are excellent. Makers of isotope equipment (gages, scales, rate meters, air sampling devices, shielding materials) are making money.

A midwest producer of heavy duty manipulators reports a small profit. Leeds & Northrup Co., Philadelphia, says it is getting a normal return from its line of measurement and control systems. A New Jersey firm expects good earnings from a soon-to-be-marketed line of railroad lanterns employing atomic isotopes.

Dr. Lauchlin M. Currie, vice president, Union Carbide Nuclear Co., a division of Union Carbide Corp., New York, reports: "Selling to the hot laboratories that study radioactivity for tracer work is a good market. Some pharmaceutical houses plan to sterilize sutures with radiation. This means special metal equipment. So does pasteurization and sterilization of food through radiation."

Fuel—Uranium producers are

"Atom Profits Still in Future"—Gordon Dean

"I HAVE to be an optimist about the future of atomic energy. There is no question but that some day a large segment of the energy requirements of the world will be supplied by nuclear power," says Gordon Dean.

Analyzing the future of atomic power is nothing new for the 52-year-old lawyer turned nuclear authority. Chairman of the Atomic Energy Commission under Harry Truman (1950-53), he's now senior vice president for atomics, General Dynamics Corp., New York.

Blue Time—Even though the future's bright, Mr. Dean concedes manufacturers of atomic hardware are going through a blue period. "We underestimated the time it would take to get low cost nuclear power. One reason: Our incentive has not been too great in this country because we have good supplies of the fossil fuels (oil, gas, coal)."

Unless there is a significant technological breakthrough, Mr. Dean makes this short term prediction: Within the next few years no large central station powerplant built in the U. S. will compete costwise with existing power facilities. It's a different story overseas where the traditional high cost of fossil fuels makes early atomic power economically feasible.

No Profit Yet—"Most companies have broken even or lost money on atomic contracts," says Mr. Dean. Three reasons: 1. Costs have been greater than anticipated. 2. Demand has been lower than estimated. 3. Technical problems have taken longer to solve than anticipated.

"While the whole atomic picture is still uncertain, the launching of Russia's sputnik seems to have awakened us," Mr. Dean says. "We will build more nuclear submarines in the near future. The outlook for fuel elements for Navy reactors is good right now. Joint efforts among U. S. and foreign firms to build reactors for overseas sales will grow. A good many research reactors will be built in the short term.

Key to Buyer—"The big money, though, will be in design and construction of large central station powerplants. We should see a real speedup here in the late 1960s, or certainly by the early 1970s."

Mr. Dean makes one qualification on the speed with which nuclear power will expand: "In the event of a major technological breakthrough, the field could grow by leaps and bounds overnight."

making money, but they have two major complaints: 1. They can sell only to the AEC. 2. The government buys more uranium overseas than it does here.

Domestic miners want legislation changed so they can sell their production in other countries, especially the Euratom community. Chances are good that Congress will heed their plea.

The industry gets a guaranteed price until 1962, and chances for an extension through 1966 are good. But producers are annoyed because the AEC will buy $400 million worth of concentrates abroad in fiscal 1959, vs. $322 million at home. AEC domestic purchases in fiscal 1958 should hit $247 million.

Architect-Engineers—Most companies in the field are making a profit though they complain that there are more contractors than customers. One indication of a slight business slump is that some big firms are bidding on contracts they wouldn't have touched a year ago.

Points up Dr. Philip Miller, technical director for Walter Kidde Nuclear Laboratories Inc., Garden City, N. Y.: "Atomic building has not functioned along traditional construction lines. For example, the manufacturer of a $100,000 'swimming pool' reactor might take on as a 'side item' construction of a $2 million-$2.5 million facility to house the reactor. This is a case of the tail wagging the dog."

Wrapup—There won't be much of a pickup in reactor work during the next few years without government intervention. Business may even fall off a little in the 1959-61 period. Nevertheless, many firms will do well, especially those supplying the Navy and those outside the power reactor field.

Most companies with heavy investments in atomic facilities will hang on until things pick up in the early to middle 1960s. Sales to Euratom will keep some companies from closing shop.

Design breakthroughs, reduction in safety tolerances, and lower fabricating costs will increase profit margins.

By the late 1960s or early 1970s atomic energy should come into its own. One observer predicts 20 per cent of our power will be nuclear in about 15 years, 50 per cent in 40 years.

Buys Brazilian Ore Fields

M. A. HANNA CO., Cleveland, with Leo Model & Associates, New York, has acquired control of St. John d'el Rey Mining Co., Brazil.

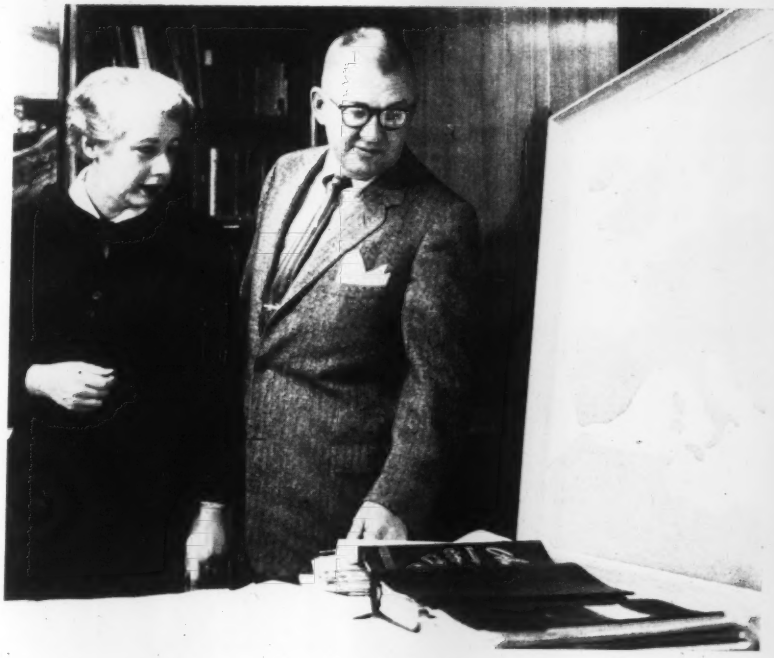
For many years St. John operated the largest gold mine in Brazil, and it has what is believed to be the largest holding of high grade iron ore reserves in the country. The properties, which cover an area of more than 100 square miles, are about 200 air miles north of Rio de Janeiro (see map). Hanna indicates commercial production could begin within three years if local arrangements can be made and economic conditions warrant. The company expects to market the ore in the U. S., Great Britain, and western Europe.

Largest Deposits — Brazilian deposits, thought to be the largest high grade iron ore reserves in the world, are estimated at hundreds of millions of tons of ore containing 60 to 70 per cent iron; the content of ore being shipped from Messabi is only slightly above 50 per cent.

Hanna plans to send an organization to Brazil immediately to investigate the gold properties, to explore the iron ore reserves, and to make studies of transportation and dock facilities.

The project is comparable to Hanna's Labrador iron ore development, which required nearly ten years of preparation and an expenditure of $300 million. Last year it shipped about 12.5 million tons of iron ore to the U. S., Great Britain, and western Europe. Hanna's total shipments in 1957 came to 26 million tons.

The next largest holding of Brazilian reserves is owned by Vale do Rio Doce Co., which is controlled by the Brazilian government.



Home from their business trip, the McDowells report . . .

Europe Wants Our Knowhow

THE MAJOR COMMODITY American producers of capital equipment have to offer Europe is engineering knowhow.

That's the conclusion of Mr. and Mrs. Robert C. McDowell, owners of McDowell Co. Inc., Cleveland engineering and construction firm. They've just returned from a business trip to England, France, Belgium, the Netherlands, Germany, and Italy.

"The Europeans respect our engineering," says Mr. McDowell, "but they won't pay our price for mill equipment. They have plenty of skilled labor working for 50 or 75 cents an hour, compared with our $2.75 rate. What's more, they have good machine tools. We saw beautiful new equipment in Germany, much of it made in America and paid for by American taxpayers. Under the Marshall Plan, war devastated plants were rehabilitated in a style that few U. S. factories could afford. It's not too surprising that many Europeans regard Harry Truman as the greatest President we've ever had."

Wanted: Licenses—Although the McDowells see a contracting market for American equipment, they're encouraged by Europe's interest in American knowhow. Says Mrs. McDowell, who is secretary and treasurer of the company her husband heads: "One of the main purposes of our trip was to size up some of the European manufacturers who have expressed interest in making our Dwight-Lloyd sintering machines or Wellman bulk material handling equipment under license."

Europe's interest in sintering is an outgrowth of its drive toward greater steel production, the McDowells report. France is the best prospect for sintering equipment, they believe, because it is heavily dependent on low grade home ores. Mining 50 million tons of ore a year, it has a sinter capacity of only 3 million tons. When the five sinter plants now under construction are finished, capacity will be doubled. The French are encouraged by the success of Appleby-Frodingham Steel Co., Scunthorpe, England, with blast furnace burdens of 100 per cent sintered material. They hope to reach that goal within ten years.

Rapid Strides — Only 14 years old, McDowell Co. has grown from a tiny outfit with a rented office ($15 a month) in Cleveland's flats to an integrated construction business with 2000 employees. Last year's sales: About $50 million.

Limited to repair and maintenance work during World War II, the company has since become an installation contractor, an engineering firm, and a fabricator. Steps in its growth were: 1. Purchase of Wellman Engineering Co., Cleveland, a manufacturer of bulk material handling equipment, steelmaking machinery, locomotive cranes, power cylinders, and contractors' buckets (1954). 2. Formation of the Riverside Div., Martins Ferry, Ohio, to fabricate structural steel (1954). 3. Purchase of Sintering Machinery Corp. of New Jersey (1955).

Iron Ore Found in Canada

Some 100 million tons of iron ore may bring a boom to Kingston, Ont., Queen's University, and the province of Ontario if the three can reach an agreement concerning ownership.

The mineral deposit in question is said to be beneath Kingston Harbor. Kingston claims ownership of 7441 acres of harbor area and all mineral rights by virtue of the statutes of Upper Canada, an annexation order in 1952, and an act of the Ontario legislature. The university claims a percentage of royalties since its geologists were the first to suggest the ore's presence. Ontario maintains that the major section of the mineral zone belongs to the crown. It concedes that the waters directly fronting Kingston constitute the harbor and are the property of the city.

During a conference at Queen's Park, Wilfred Spooner, minister of mines, suggested the province might be willing to accept less than 50 per cent of the potential revenue. If the problems can be ironed out, development will begin this year.

Blough Bombs Taxes

Says: With declining profits and inflation, they cause $10 billion expansion deficit yearly

CORPORATE profits dropped from $22 billion in 1950 to about $20 billion last year. In the process, the value of the dollar shrank 15 per cent. Based on those figures, the purchasing power of corporate earnings today is only 77 per cent of what it was seven years ago.

Roger M. Blough, chairman, U. S. Steel Corp., points out that only $8 billion worth of the nation's corporate profits in 1957 could be reinvested in productive facilities. Adding $11 billion raised through the sale of stock or borrowing and $13.5 billion in depreciation funds, corporations were able to spend $32.5 billion for capital expansion last year.

They should spend an additional $10 billion annually through 1965 to keep Russia from pulling far out ahead of us in the industrial production race, asserts Mr. Blough. While Russia claims to have doubled her industrial production since 1950, American output went up only 30 per cent.

Stumbling Block—Victory in the "race" will go to the nation which is most successful in the formation of capital, contends Mr. Blough. While the scientist can give us knowledge, it takes money to convert that knowledge into material. But our tax laws restrict us from obtaining the necessary capital, he adds.

"Those laws have purposefully discriminated against investors, even though they have diminished the long range yield that the Federal Treasury might have obtained—and sorely requires—from tax sources," Mr. Blough declares.

He believes we face an even more dangerous barrier to capital formation: The political philosophy that "finds expression with some members of a Senate investigating subcommittee which seemingly is seeking to reduce still further our capacity for generating capital by inflaming public opinion against necessary corporate profits."

Remove It — Mr. Blough concludes: "We have three courses of action: 1. Let Russia outproduce us, which is unthinkable. 2. Realistically review the laws—and the political attitudes—which now discourage savings and investment. 3. Adopt something akin to Communism.

"We must clearly break through the tax barrier by altering the way in which taxes affect the attractiveness of risky ventures."

THE STRIPPING SHOVEL that rides this base lifts an average of a ton a second. Base contains 226 tons of steel. Welding reduced construction costs 24 per cent, says Lincoln Arc Welding Foundation, Cleveland

Russia Take Note

Publicity aimed at the shortage of engineers is paying off. In the fall of 1957, a record 257,777 students were enrolled in schools accredited by the Engineers' Council for Professional Development—a 5.5 per cent gain over the previous peak of 244,390 students in 1947.

During the 1956-57 academic year, 27,748 B.A. degrees, 5203 M.A. degrees, and 596 Ph.D. degrees were awarded by engineering colleges, notes a survey by the U. S. Office of Education and American Society for Engineering Education. The highest percentage of B.A. and M.A. degrees was in electrical engineering. The highest percentage of Ph.D. degrees was in chemical engineering.

Enrollment—Some 67,071 freshmen enrolled in engineering last fall, a 1 per cent increase over the 1956 mark. All other classes in undergraduate schools also showed growth. Part-time and evening undergraduate enrollment reached 30,458, or 17.1 per cent above the 1956 figure. Enrollment for M.A. degrees went up 7.6 per cent; the number of candidates for Ph.D. degrees climbed 22.9 per cent.

Beginning last fall, male engineering students in 152 ECPD-accredited schools in the U. S. and its possessions made up 12.8 per cent of total male enrollment, vs. 12.5 per cent in '56. The figures do not include 69 schools accredited by state or regional agencies.

$1 Billion Cleaning Bill

Industry's annual outlay for the purchase and operation of smoke control equipment is over $1 billion, says Research-Cottrell Inc., Bound Brook, N. J., maker of electrostatic precipitators.

By the end of last year, 2855 precipitators with a total gas cleaning capacity of more than 264 million cu ft per minute were in use. The amount of dust collected annually by the power industry alone would cover Manhattan Island with a layer 6 in. thick.

Wire Cloth Finds New Jobs

It's widely used in missiles, automobiles, airplanes, and rubber goods. Industry expects slight decline in business this year. Foreign competition is a big headache

THE OUTLOOK of the wire cloth industry is brightened by new metals and alloys, new applications, and new products.

Because the industry is not as closely knit as its product, accurate sales statistics are not available. The best estimate of last year's dollar volume is $35 million. Outlook for this year: A decline of $2 million to $3.5 million.

The Industrial Wire Cloth Institute estimates that there are about 45 manufacturers of cloth in the country, with the top five or six firms doing nearly half the volume. Some firms, Michigan Wire Cloth Co., Detroit, for example, produce the cloth and fabricate end products.

Markets — Most of the industry's gains in the last 15 years have come from filtering and straining applications, says W. H. Blodgett, vice president of Michigan Wire Cloth.

A growing application is being stimulated by the use of closer tolerances and precision-built machinery in the automotive, aircraft, capital equipment, and chemical industries: They use wire cloth to protect gases and liquids from contamination by such things as foreign particles.

Three other major uses are: 1. Wire cloth-grading of materials like cereals, seeds, minerals, abrasives, and powders. 2. Reinforcing of rubber and plastic products. 3. Protective guards on machinery. Miscellaneous applications run the gamut from hair curlers to ventilation bezels for mattresses.

Materials — Metalwise, stainless steel, nickel, Monel, and aluminum have scored the biggest gains in recent years. But copper, brass, bronze, and low-carbon steels, account for most of the tonnage shipped.

Wire cloth producers also offer a variety of coatings, including galvanize, tin, lead, copper, chemical, plastic, rubber, and paints. Meshes of industrial cloth range from 3-in. openings to 700 wires per linear inch.

Business Conditions—While most wire cloth markets have dipped, William Haarbauer, general manager of Reynolds Wire Div., National-Standard Co., Niles, Mich., reports recent order increases from defense contractors. Several other firms say they have an upturn in inquiries for missile applications.

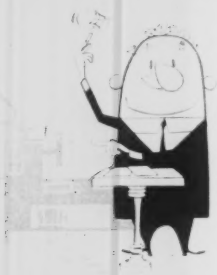
Competition in the product fabrication end of the business is keen, and most firms guard their experimental work carefully. Example of development work: Nickel-clad wire is being tested for use in nickel-cadmium batteries.

A major headache for the industry is foreign competition. It's particularly severe in the finer meshes where labor represents a high proportion of total cost. "A 25 per cent duty is hardly adequate protection when we pay three and half times as much for our labor," complains one executive. The industry will vent its problems during the tariff hearings this spring.

Common Market Sets Tariff

On Feb. 10, the European Coal & Steel Community set up a harmonized steel tariff (ranging from 3 to 12 per cent) for its six countries (France, West Germany, Italy, Belgium, the Netherlands, and Luxembourg). It marks the high point of the establishment of the Coal-Steel Common Market which abolishes custom barriers, quota restrictions, currency restrictions, national subsidies, double-pricing, and transport discriminations.

The Common Market was opened five years ago. At that time, most barriers to coal and steel trade among community countries were lowered. Certain duties and subsidies (now abolished) were retained to give industries time to adapt to the new market.



Task Group Plans for Tool Disposal

A GREATER SENSE of urgency about the government's $3.5 billion worth of machine tools is evident among Office of Defense Mobilization officials. Gordon Gray, defense mobilizer, has asked Commerce and Defense Departments, General Services Administration, and the Small Business Administration to reform their interagency task force on machine tools. Purpose: Set up new guidelines for the government's disposal program. Last year, the task group established uniform leasing arrangements for Uncle Sam's tools.

Reason for the action: Quantities of tools to be disposed of in the next few years will be "somewhat greater" than they have been in the past, says a high ODM official. Last year, about 11,000 were declared to be in excess of government needs. Over 9500 were sold; about 1500 were transferred among government agencies or put into the national industrial equipment reserve. Of those sold, about one-third were scrapped.

More Good Tools Will Be Excess

Some 12,000 tools are expected to be declared excess this year. However, ODM officials don't look for one-third of them to be scrapped. The Air Force, particularly, is disposing of more good, general-purpose tools. ODM expects the trend to continue.

There are about 2200 tools in the industrial reserve now. It's reported that GSA would like to add 2500 to that if it can get $1.5 million for storage costs. Figuring that over 1000 tools might be transferred among agencies, the number of tools sold this year might not be much above last year's figure, but the pressure is on to boost disposal well above the 12,000 mark.

The interagency task force is expected to take a stab at resisting those pressures.

Call for Uranium Stockpile

Look for the State Department to fight hard to stop Sen. Frank Barrett's (R., Wyo.) plan for a uranium stockpile. If it went through, other mineral interests would be sure to clamor for the same treatment, and the State Department wants to avoid strained relations with mineral producing countries.

Senator Barrett wants the Atomic Energy Commission to contract immediately for an additional 7250 tons of uranium milling capacity in the U. S. Output over a four-year period (1959-62) would come to 29,000 tons of uranium oxide. It would be released from 1963 through 1966, replacing present sources of supply—Canadian and Belgian Congo uranium are being consumed by the AEC. Canadian contracts expire in 1962, and the AEC does not plan to extend them because of the depressed condition of the U. S. industry.

GI Housing Extension Coming?

Don't be surprised if the GI housing bill is extended for veterans of World War II. It is regarded as a natural antirecession move by both parties and certain to make political hay in this election year. So far, only about 25 per cent of eligible veterans have used the benefit.

Hearings on the program begin this week. Sen. Homer Capehart (R., Ind.) has asked extension of the law for two years.

Public Works Backlog Is Big

Says Maj. Gen. John Bragdon, special assistant to the President for public works planning: The states have a backlog of needed public works projects running over $200 billion, while planning programs probably amount to one-tenth of that. Over $2 billion in projects are on a "ready-to-go" basis, awaiting funds.

The point of the general's analysis: A big federal public works program is not needed if the states could do the job. Look for a federal-state program to get these projects rolling around the middle of the year—if the economy stays down.

DPA Hearings in Congress

The first act in a play designed to allow the Defense Production Act to expire June 30 was performed last week on Capitol Hill. Sen. Willis Robertson's (D., Va.) Joint Defense Production Committee held closed hearings with Gordon Gray, ODM head, as the chief witness.

Mr. Gray was questioned closely about the stockpile and ODM's preparations for nuclear attack. The committee is interested in modifying the disposal feature of the stockpile act.

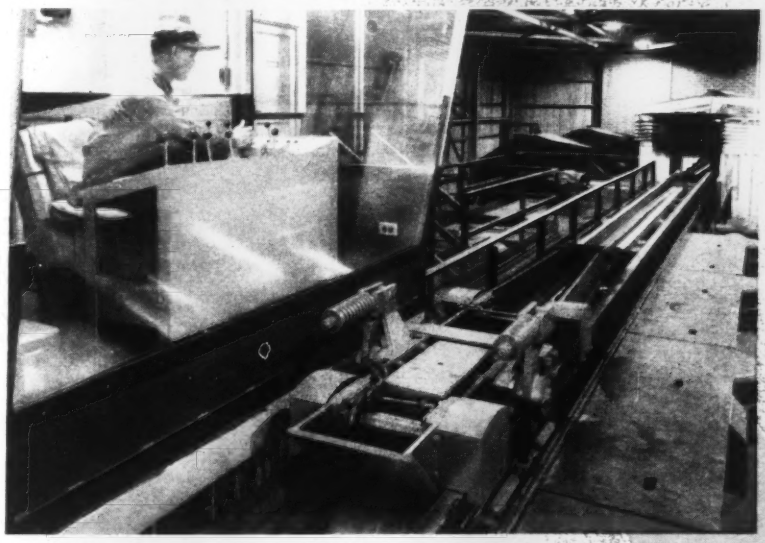
But any attempt to get the government out of the metal business will run straight into a rising tide of protectionist sentiment on Capitol Hill.

Defense Needs Another Supplement

With one supplementary appropriation for $1.3 billion for defense in the fiscal 1958 budget already through Congress, expect another to come out next month for about the same amount. This one will have more hardware dollars in it.

Talk at the Pentagon: The new request will be for the Snark and Regulus missiles, B-52s, K-135 tankers, Polaris-launching subs, and, maybe, another aircraft carrier.

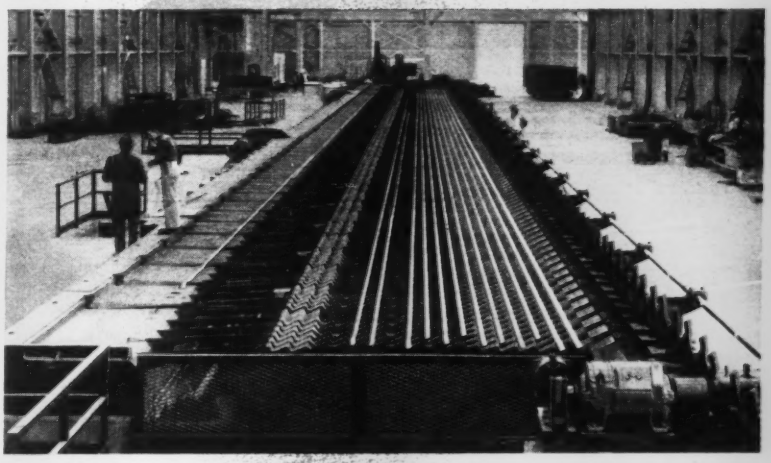
MORGAN MILLS
MORGAN QUALITY



from START to FINISH

MERCHANT AND ROD MILL
Atlantic Steel Company
Atlanta, Georgia

Morgan engineered and equipped from charging car to cooling bed this new Atlantic Steel Mill is now in full operation. This mill is just one of two hundred and twenty-one Morgan continuous rolling mills which have been purchased by steel plants throughout the world.



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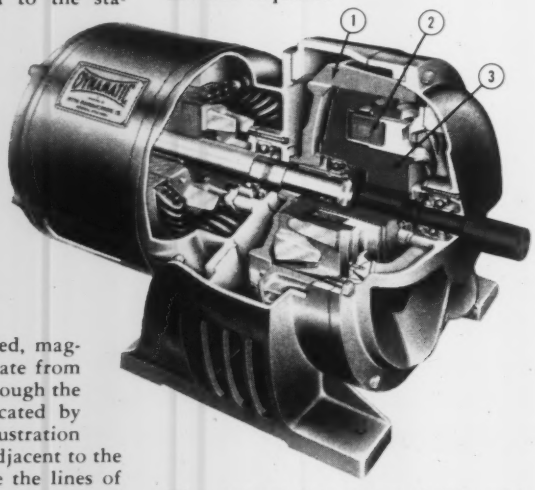
RM 72

HOW DYNAMATIC® Drives Provide Infinitely Adjustable Speed with AC Power

Dynamatic Ajusto-Spede® and Dynaspede® Drives operate from an alternating current power source and are infinitely adjustable from zero RPM to full output speed. Accurate control of output speed is obtained by varying the current in a single field coil.

Each Dynamatic Drive consists of a constant speed AC motor and an eddy-current coupling. Torque developed in the motor is transmitted through the coupling by electromagnetic attraction between its driving and driven members.

The driving member, or drum (1), is mounted on the end of the motor shaft and surrounds the rotor, or driven member (3). The drum is free to rotate independently of the rotor until current is applied to the stationary field coil (2).



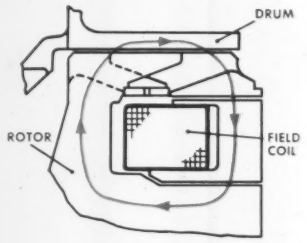
1. **Input Drum Assembly**
2. **Stationary Field Assembly**
3. **Output Rotor Assembly**

As the field coil is excited, magnetic lines of force emanate from the field coil and flow through the rotor and drum as indicated by arrows in cross-section illustration (A). Poles on the rotor adjacent to the smooth drum concentrate the lines of force into localized areas of "high flux" density in the drum's inner surface, shown in illustration (B). As the drum rotates about the rotor, these high flux areas sweep the inner surface of the drum, causing a variation of flux density that generates an eddy-current field in the drum's inner surface. Magnetic attraction between this eddy-current field and the rotor poles causes the rotor to rotate with the drum.

The torque transmitted from the drum to the rotor varies with the current applied to the field coil and with the "slip", or difference in speeds between the drum and rotor. Speed control with eddy-current equipment is obtained with a control system that adjusts field coil current to deliver the required torque at the desired slip.

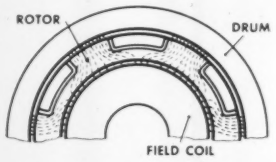
The control systems used with Dynamatic Eddy-Current Equipment operate on alternating current and require no special power source. Because of the low power required for field coil excitation, rectifying of field coil current is easily accomplished electronically. Expensive motor-generator sets are not required.

The control features available with Dynamatic Eddy-Current Equipment include constant speed regulation, acceleration control, torque regulation, cascading of multiple units, inching and threading, and numerous others as required by individual applications. Dynamatic Eddy-Current Equipment is ideally suited to automatic control.



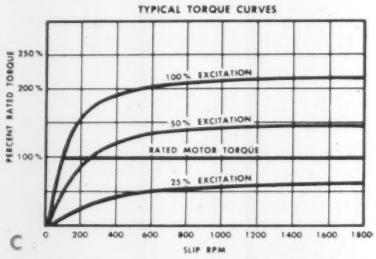
A

Flow of magnetic lines of force through rotor, drum, and stationary field.



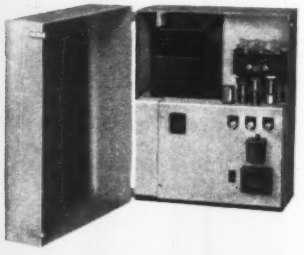
B

Concentration of magnetic lines of force by the rotor poles.



C

Typical torque curves show torque at various values of excitation. The horizontal line is rated motor torque.



D

The electronic control systems used with Dynamatic Eddy-Current Equipment do not require a special power source or motor-generator sets.

Send for your copy of Bulletin D-582 which gives detailed information on Dynamatic Eddy-Current Equipment.

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DYNAMATIC DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

Haller Press Is Simplified

American company designs the unit here but has it built in Germany. Lower labor costs abroad, plus simplified design, put cost 30 per cent under presses built in U.S. to do same job

GENERAL Electric Co. is forming silicon-carbide resistors (Thyrite) on an 18-ton powder metal press built in Germany for Haller Inc., Plymouth, Mich. The press costs about 30 per cent less than presses built in the U. S. to do the same job.

D. H. Chadwick, supervisor, manufacturing engineering and shop operations at GE's Metallurgical Products Dept. plant, Edmore, Mich., says the company for the first time is pressing four resistors at once.

Multiple tooling has almost eliminated tool breakage, part quality has increased, and costs have decreased, Mr. Chadwick indicates. Uniformity of fill and a floating die setup are the most advantageous features of the press, he says.

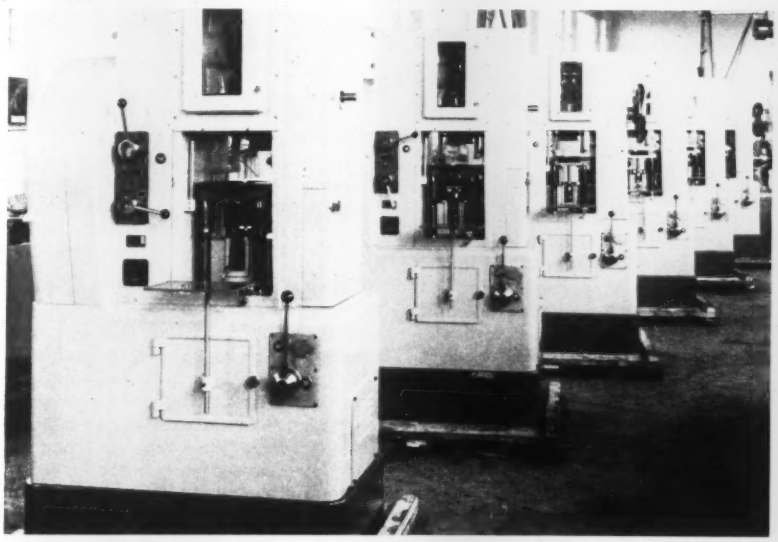
Simplified—David Cameron, Haller sales manager, says the press was designed in the U. S. to do the job without frills. The speed control (range: 8 to 12 strokes a minute) is a simple gearbox and pulley arrangement. The ram is the straight-drive type.

Haller offers 8, 13, and 18 ton presses built by Ortlinghaus-Werke, Remscheid, Germany. Replacement parts are domestic.

The 18-ton model lists at $7000, compared with a $10,000 tag on a U. S.-built competitive press. This includes a 15 per cent import duty.

Operation—The 18-ton press will produce parts to a maximum size of 3.2 in. Maximum fill depth is 2.4 in. The 2750-lb press is 55 in. long, 32 in. wide, and 70 in. high. For tool changing, the bottom punch centers itself with the die and the upper punch is guided by a split bronze bushing. No pit is needed for core rods.

Haller, formed in 1954, sold its first press a year later. Business has increased 50 per cent each year. Mr. Cameron expects a 25 per cent increase in 1958. The company also builds a 40-ton press in the Plymouth plant. The frame is imported from Germany. Parts are purchased locally. Watson-Stillman Press Div., Farrel-Birmingham Co. Inc., Roselle, N. J., is licensed to make a 125-ton hydraulic press for Haller.



Imported from Germany, Haller's 18-ton presses can produce parts to a maximum size of 3.2 in.

Leasing Is Big Business

The leasing of machine tools and metal forming equipment is booming, says William R. Heins, president, United States Leasing Corp., San Francisco. Leading user industries are: Fabricated metal products, ordnance and defense products, electrical equipment and motors, automotive vehicles and parts, metalworking machinery, precision and scientific instruments, agricultural equipment and parts, mining and oil well equipment, and consumer durables.

Mr. Heins says that about 2 per cent of the machine tools and metal forming equipment in industry is leased. Their value is set at close to $180 million. Mr. Heins predicts that tool leasing will double by 1962. The average lease runs three to five years and has a one year renewal option.

Uranium Production Up

By the end of 1957, domestic uranium concentrate production reached an annual rate of 10,000 tons.

During the calendar year, 8640 tons of concentrate were produced in the U. S. and received by the Atomic Energy Commission. Receipts from foreign sources came to another 11,826 tons.

Included are 146 tons of concentrate which were produced as a byproduct in the chemical processing of phosphate rock in Florida and Illinois, from the treatment of Idaho euxenite at the St. Louis plant of Mallinckrodt Chemical Co., and from reprocessing refinery residues at the Vitro Corp. plant in Cannonsburg, Pa.

At the beginning of last year, 12 mills were operating in the West. Four more began production during the year.

Missilemaker Builds

Martin Co.'s Denver Div. will build a 115,000 sq ft addition to its plant near Denver. Construction will begin about June 1. Completion date: Jan. 31, 1959. Cost: About $2 million.

PRODUCTION MANAGERS

Three Ways They Beat Cost Crisis

PRODUCTION MANAGERS can beat the cost crisis.

They are in the ideal spot to see ways to cut costs through use of more efficient equipment. In fact, it's their job to find ways to save, sell their ideas to top management, and get them translated into action. The last step is often the toughest, say production men. They suggest:

1. Pinpoint for management what you think is the area of greatest potential savings.
2. Ask other departments and groups if they agree.
3. Use time or method studies to check your thinking.
4. Call in equipment makers for advice.
5. Show management a specific solution, supported with cost and production data.
6. Get worker support by showing benefits of a change.
7. Get all affected groups to work together; a cost reduction team may be the answer.

This article is part of a campaign to help industry achieve lower unit production costs. The accompanying case studies show how production supervisors have found great savings and convinced management of their worth. Perhaps your production supervisor can, too. If so, enter the Cost Crisis Award Competition. Write to the Cost Crisis Editor, STEEL, Penton Bldg., Cleveland 13, Ohio, for your awards kit.

1. By Better Material Handling

The Company: Timken-Detroit Brake Div., Rockwell Spring & Axle Co., Ashtabula, Ohio.

The Problem: Timken-Detroit employs 350 and produces 500 to 800 assorted brake assemblies each 8-hour shift. The brakes weigh 10 to 180 lb. C. W. Keller, assistant plant manager, tells what happened:

"Our parts department supplied each of our 12 brake assemblers with parts in wheeled carts. Completed brakes were placed on a bench behind the assembler for inspection. A packer lifted the brakes from the bench and packed them on the spot. A lift truck took the crates to the shipping room."

Lift trucks carrying small cargoes were constantly running around the plant. Packing materials were scattered and interfered with assembly operations. Packers suffered lifting fatigue, and inspectors could only check each brake once.

When production was increased, scattered piles of brakes accumulated, awaiting inspection, packing, or transportation. Production men started screaming, and methods engineers stepped in to make a study. It looked like handling was the key to cutting costs, so material handling firms were called in.

A cost reduction team asked management for $5429 to set up a conveyor system built by Rapids-Standard Co. Inc., Grand Rapids, Mich.

The Solution: Rapids-Standard engineers placed the 12 assembly benches in a straight line 20 ft apart and facing the parts bank. This makes it easier to wheel parts to each station.

Gravity operated feeder conveyors run from each assembly station to a 140 ft central conveyor (see photo). A foot operated stop keeps accumulated units from entering the main line until they have been inspected.

A second check takes place when brakes reach the end of the main conveyor. Units are placed on pallets

2. By Improved Tooling

The Company: Jig Bushing Co., Pontiac, Mich.

The Problem: Cutting tools were breaking after finishing 550 to 600 pieces. The company wanted to boost production in milling a ⅛-in. deep lock screw slot in a jig bushing. It switched from a universal milling machine to a 4 spindle, 1½ hp. drill press with a two-station manual fixture.

Because of higher speeds and feeds, standard cutters couldn't handle the Timken 52100 ball bearing steel (207 Bhn) used for the bushing. At $6 to $8 per cutter, production costs were soaring.

Instead of buying a new machine or returning to the milling machine, A. W. Wike, factory manager, decided to compromise. "In a small production shop like ours (70 employees) we have to substitute ingenuity for new machines," he says.

The Solution: Mr. Wike tried different cutters with little success until Goddard & Goddard Co., Detroit, designed a spiral end mill cutter for the job — it's specially heat treated.

The Results:

- Tool cost per piece dropped from 1.5 to 0.016 cents.
- Machining time jumped from 20 pieces to 360 pieces per hour.
- Cutter life increased from 600 to 60,000 pieces; 2200 to 2300 pieces per grind were obtained.

which ride on four, floor mounted, double roller sections.

Loaded pallets are pushed to the end of the floor tracks where they're strapped. After five pallets have accumulated, a lift truck carries them to shipping or storage areas.

The Results:

- Unit costs were reduced 5 per cent.
- Unit production was increased, although the work force was reduced three men per shift.
- Material handling time was cut 33 per cent.
- Plant efficiency was boosted 20 per cent.
- Lift trucks were utilized 66 per cent more effectively.
- A 5 per cent annual saving on in-plant operational costs was realized.

3. By Replacing Old Equipment

The Company: Buick Div., General Motors Corp., Flint, Mich.

The Problem: Running changes during the model year boosted costs of making steering column jackets. "New dies for the punch presses cost several thousand dollars each time we made a change," says Russel Sauter, chief master mechanic of Buick's Axle Div.

When wall thicknesses of the tubes were increased from 0.0625 to 0.090 in., the old methods couldn't handle them. Shock and fatigue led to tube deflection and loss of piercing accuracy. What's more, there wasn't enough capacity in the line to handle additional changes. New equipment was needed. The question: Buy more punch presses, or try a different type of unit?

The production department initiated a project study through the master mechanics' group to develop a cheaper approach to tube piercing. Mr. Sauter called in several machine tool builders for ideas. One solution won management's approval.

The Solution: Tube piercing machines were designed and built for the job by Koppy Tool & Die Co., Ferndale, Mich. They support the tubes at top and bottom to eliminate distortion. Koppy says the machines are capable of piercing tubes up to 3 in. in diameter at a rate of 600 per hour.

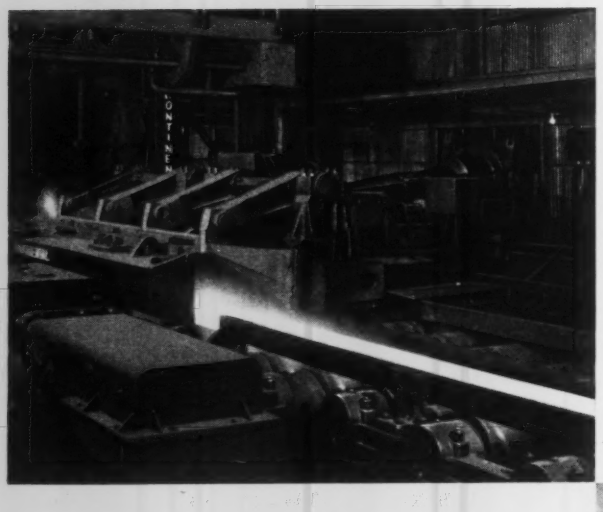
Tubes slip over the machine mandrels, and as the punch comes down, the tube and mandrel are held rigid by upper and lower compression inserts. Scrap drops through the pieces into the mandrel and falls out when the tube is removed. Lingering pieces are forced out when the next tube moves in.

Up to three standard operating heads can be mounted on one machine base, so multiple holes can be pierced in one loading.

The Results:

- Unit costs were cut nearly 14 cents per tube.
- Changeover costs were reduced $800 to $900.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

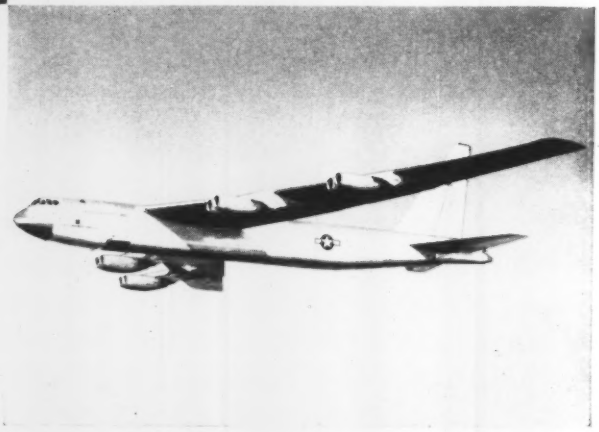


THE HEAVIER THE LOAD...

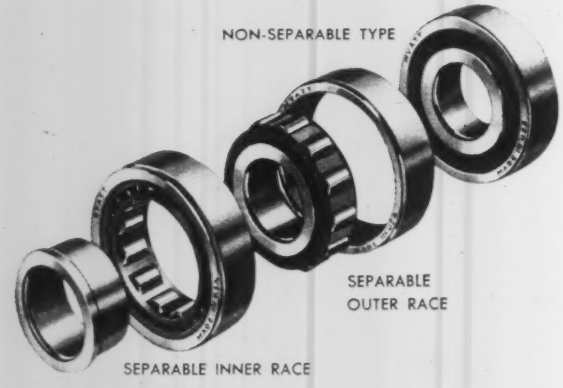
the more you need HYATTS . . . because for sheer load-carrying capacity in continuous service, straight cylindrical roller bearings have no equal. That's why leading steel mills use HYATT Hy-Rolls for dependability.

THE HIGHER THE SPEED...

the more you need HYATTS . . . because they're built with superior steels, scrupulous control of internal clearances and uncompromising inspections to assure smoother running, even at RPM's required in jet engines.



THE MORE YOU NEED *Cylindrical* HY-ROLL BEARINGS



More and more, as loads and speeds edge upward and housings must often be reduced in size, design engineers are turning to HYATTS to help squeeze improved life/load ratings into limited space. Quality-built HYATT Hy-Rolls not only solve the problem of increased radial loads, but the shouldered-race types will take a surprising amount of thrust as well. Ask your nearest HYATT Sales Engineer for recommendations—he can be a mighty big help to you! Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.; Pittsburgh; Detroit; Chicago; and Oakland, California.

THE RECOGNIZED LEADER IN CYLINDRICAL BEARINGS

GM FORWARD FROM FIFTY

HYATT HY-ROLL BEARINGS

THE "WORKHORSES" OF MODERN INDUSTRY

U. S. Car Production

(First two months)

	1958*	1957
Imperial	3,096	7,362
Chrysler	10,321	26,861
De Soto	7,525	30,994
Dodge	15,538	54,697
Plymouth	63,948	118,228
Chrysler Corp. total	100,429	248,142
Lincoln	6,745	10,249
Edsel	3,272	——
Mercury	24,745	67,927
Ford	209,830	286,923
Ford Motor Co. total	243,592	365,250
Cadillac	26,118	28,543
Buick	62,952	100,274
Oldsmobile	77,430	48,573
Pontiac	58,428	78,027
Chevrolet	274,972	276,416
General Motors Corp. total	499,900	571,833
Packard	775	3,742
Studebaker	4,505	9,415
Studebaker-Packard Corp. total	5,280	13,157
AMC Rambler	31,125	14,805**
Total	880,326	1,213,187

*Preliminary.

**Includes Nash and Hudson.

Dealers Wait for Spring

NOW'S THE TIME for a spring upturn to appear, say automobile dealers surveyed by STEEL last week. With few exceptions, sinking sales have boosted dealer stocks and forced car builders to slow down industry production to less than 100,000 units weekly.

Even with the cut in output (expected to last through the quarter), more than 900,000 cars are either in dealers' hands or in transit, claims *Ward's Automotive Reports*. At the current daily selling rate of 13,000 or less, dealers can't dispose of that many vehicles in less than 70 days.

And with each production cutback, steel stocks of automakers rise above the 15 to 20 day level they would like to maintain. On the industry level, inventories are estimated at 22 to 26 days—though some segments are much higher. The situation seems to scotch hopes of steelmakers who looked for a pickup in automotive buying in April.

Dealers are prone to blame high car prices and the weather for the sales slump; their comments indicate which lines are doing the best and which cities seem hardest hit.

Pittsburgh

Massey Buick Co.—"Business is terrible. We have almost a two months' supply of cars. Under normal conditions, we'd have about 20 days' supply. Sales are far below what they were a year ago. There's less overtime in the plants; many people are idle; and everyone is scared by the business reports."

Don Allen Chevrolet Co.—"We usually have a 45-day supply of cars; now we have around a 60-day supply. We are experiencing a slight sales gain, but the rate of increase has been too slow to help."

Eierman Cadillac Co. — "Our sales are better than last year's, and we have less than a 30-day supply of cars, which is normal for us."

Dormont Oldsmobile Co. — "We can't get people to come out and look at cars in this weather, but sales still are holding about even with those of a year ago. We definitely expect a spring upswing."

Wright Pontiac Inc. — "People just aren't buying cars now. The reasons are lack of overtime, layoffs, and the weather. We have about a 45-day supply of cars—about two weeks more than we'd like."

New York

Don Allen Midtown Chevrolet Inc.—"We have about an 18-day supply of cars, and our sales are 50 to 75 per cent better than they were at this time a year ago. Most of the gain is in Chevrolets; Pontiac sales are about at last year's levels. There are fewer complaints about price this year, but some customers

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are saying cars are too long."

Ralph Horgan Inc. (Ford)—"We're carrying a normal supply (30 days), but sales are about 5 to 10 per cent less than last year's. Customers are afraid to commit themselves to a new car until the economy becomes more certain."

Chrysler Manhattan Co. Inc.—"Up until the storm, our sales were as good as last year's, but that's because we could have sold more cars in 1957 if we could have obtained them. This year, supply and demand are about equal. We look for a sales upturn in the spring."

Chicago

Nelson Chevrolet — "We've got about a 40-day supply of cars, and January and February are about even with last year. Customer traffic is holding up well, but prices are the biggest sales obstacle. We don't see any signs of a spring upturn."

Hartigan Chevrolet Inc.—"We've got a 120-day supply of cars on hand, and sales are down 50 per cent from last year's. Price still is the big bugaboo. We're selling with a markup as low as 5 per cent at times and probably average just under 10 per cent. Used-car sales are comparatively good." (Hartigan is in an area where unemployment has been particularly high).

Martin J. Kelly Inc. (Chrysler-Plymouth)—"Sales so far this year are 20 per cent ahead of last year's. We have only a 30-day supply of cars on hand. Traffic through our showrooms is equal to last year's." (Chrysler Corp. should give this outfit a medal. Kelly is the only dealer surveyed that claims an increase over 1957 sales rates).

Courtesy Motor Sales Inc. (Ford)—"Sales are about 25 per cent below last year's. We have about a 45-day inventory. Price is the big obstacle, and showroom traffic is down about 40 per cent from new model introduction time."

Logan Square Nash—"We have a 45-day inventory, which is a little larger than we like to carry. Sales, however, are 30 per cent above last year's. Our Rambler is giving us plenty to talk about on the most important topics to this year's buyer: Price and economy."

Cleveland

Cleveland's Automobile Week, aimed at showing the importance of the auto industry to the community, has just concluded. The National Automobile Dealers Association indicates other cities may follow Cleveland's lead if the project boosted sales.

Lake Buick Co.—"Our January sales were down 50 per cent from those of a year ago. Most of us have stopped ordering. February has been slightly better. We have about 40 cars on hand (a four or five weeks' supply), but normally we'd have about 60."

Lloyd Motors Inc. (Rambler)—"Our sales are the same as January's, and that's 400 per cent better than last year's. We have about a 15-day inventory. We do notice that most of our buyers are 45 years old or over."

Lou Meliska Pontiac Inc.—"We expect to sell as many cars in '58 as we did in '57, but sales currently are 25 per cent below last year's. There don't seem to be any complaints about style, and there's little more than normal resistance to price. We have about a 30-day inventory."

Meisel Motors (Lincoln-Mercury)—"January sales were down about 3 per cent from those of a year ago, but we're looking for better business in the spring. Lincoln sales are up about 30 per cent from those of a year ago, but Mercury sales are down about the same amount." Meisel is carrying a 45-day inventory.

Hull-Dobbs Inc. (Ford)—"Business is down 35 to 40 per cent from what it was a year ago. We're making about five deals a day. When business is good, we make 15 or 20. We have 150 to 175 cars on hand (30 to 35 days' supply). There's no more price resistance this year than last, but a lot of people have been telling us they liked the '57 styling better than this year's."

Detroit

Wagner Oldsmobile—"Olds is in third place now, both in production and sales. Our sales are 15 per cent higher than they were last year, but that's unusual. We don't expect to maintain that pace all year. We're carrying about a 40-day inventory."

Jerry McCarthy (Chevrolet) — "We're at least 10 per cent ahead of last year and expect to double that in March. You do have to knock down your profits though. We're only averaging a 6 or 7 per cent markup. We have about a two-week inventory, but we will boost that considerably by spring."

Washington

L. P. Stewart Inc. (De Soto-Plymouth)—"We have a 70-day inventory, and sales are 28 to 30 per cent below last year's. Bad weather throws comparisons off. Plymouth sales are not down as much as those of De Soto."

Cherner Motor Co. (Ford)—"This month is fair, but we're living in expectation of a spring upturn. Buyers are definitely more conscious of price this year than last."

Outlook

This year, the chances for a spring sales surge seem good as buyers tend to recover some of the confidence they lost earlier in the year. But the pickup will probably be spotty, and cities with heavy unemployment aren't likely to gain.

Production will stay low until dealer inventories shrink to the 40 to 45 day level.

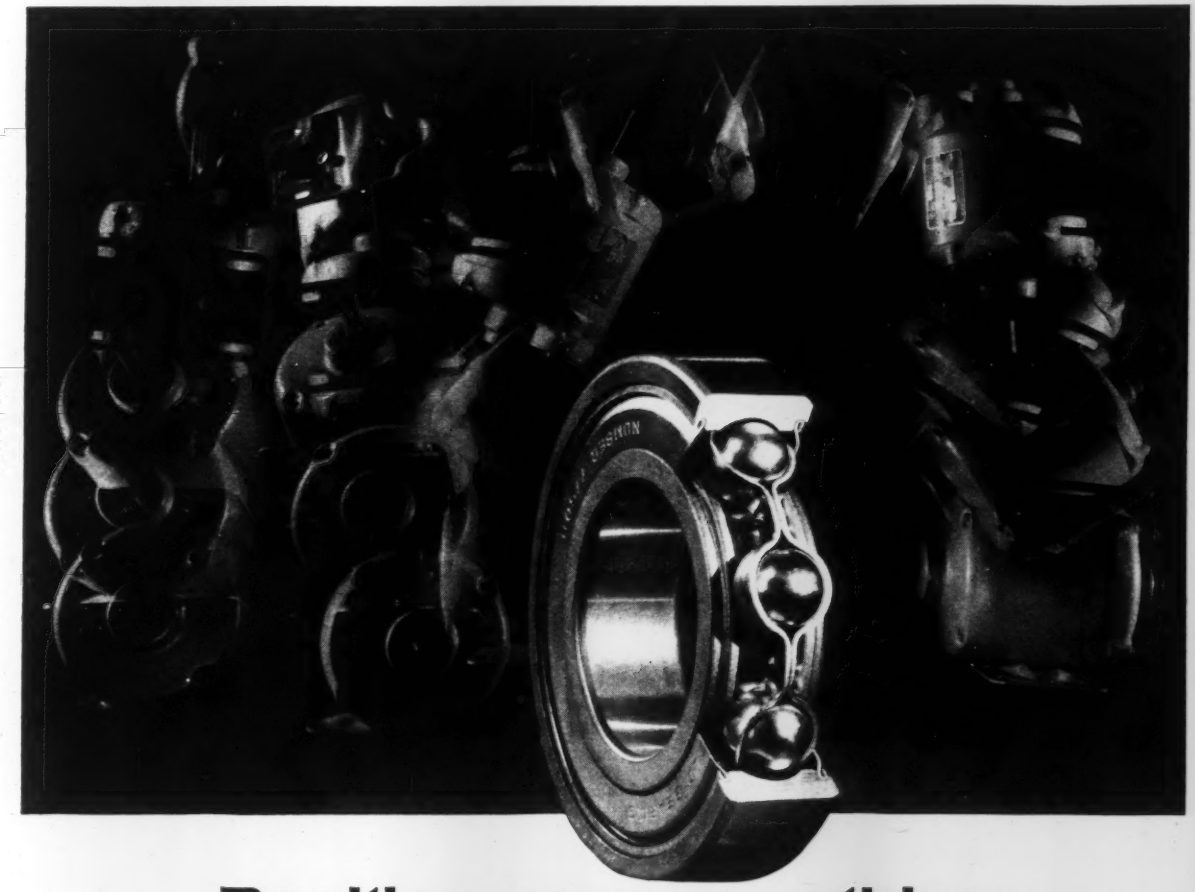
U. S. Auto Output

Passenger Only

	1958	1957
January	489,357	641,591
February	.....	571,098
March	.....	578,826
April	.....	549,239
May	.....	531,365
June	.....	500,271
July	.....	495,629
August	.....	524,354
September	.....	284,265
October	.....	327,362
November	.....	578,601
December	.....	534,714
Total	.....	6,117,315
Week Ended	**1958**	**1957**
Jan. 25	107,495	145,191
Feb. 1	104,359	140,411
Feb. 8	109,028	147,163
Feb. 15	101,656	145,846
Feb. 21	92,798†	138,938
Mar. 1	95,000*	140,362

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

ND FACTS



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Such versatility is welcomed by appliance makers . . . machine tool builders, too . . . because it means infinite freedom of design. Accessibility for service need not be the ruling factor in motor location. For motors made with New Departure ball bearings . . . like the bearings themselves . . . are built to be forgotten for long periods of service without need for relubrication. Best of all, you'll find there's no adjustment necessary because of wear.

If you're looking for ways to simplify product design while you improve product performance, write or call for details on New Departure ball bearings. New Departure Div., General Motors Corp., Bristol, Conn.

1908–1958

GM

FORWARD FROM FIFTY

ND NEW DEPARTURE

DIVISION OF GENERAL MOTORS, BRISTOL, CONN.

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And you'll save money, too, with Timken 52100 tubing—by substituting it for costlier alloy steels. You get a steel that's through-hardened in moderate sections, that can be hardened to file hardness or tempered back as you desire.

Many thousands of tons of Timken 52100 have been made into aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts and precision instruments.

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Give us 24 hours and we'll have your Timken 52100 tubing on its way to you. It's available in O.D.'s from 1" to 10½" and a wide variety of wall thicknesses. Write, phone or wire: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

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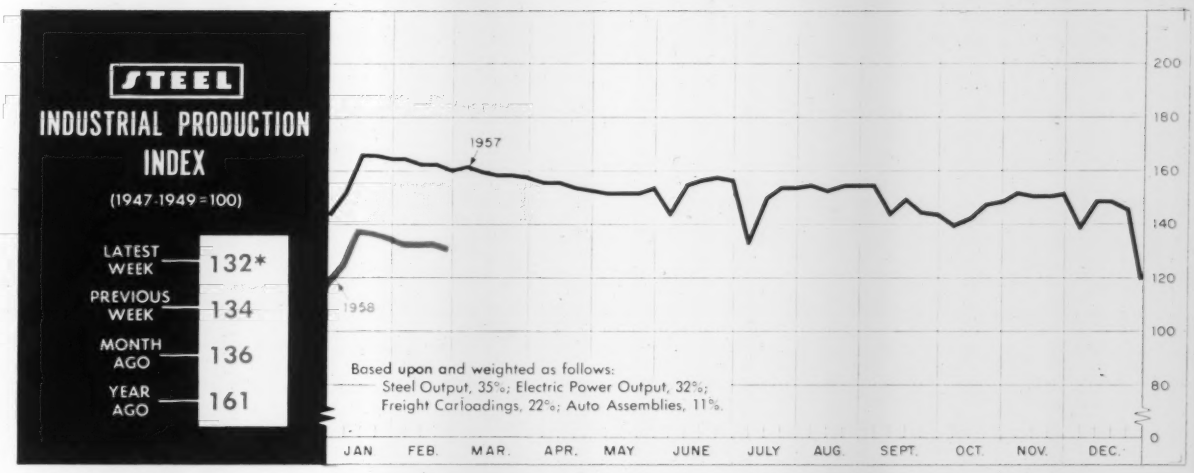

*Week ended Feb. 22.

Business Downtrend Is Flattening Out

THERE ARE some pretty good indications that the recession is bottoming out right now. While there will be no upturn in the near future, the level of industrial activity is not likely to go significantly lower than it was in February.

The most important clue to this outlook is found in STEEL's industrial production index (above). With the exception of the final week in February which registered a preliminary 132 (1947-49=100), the trend line held steady at 134 during the month. It was the first time the index had remained constant for three weeks since last August—before the recession got underway. This indicates the components of the index have just about hit their lowest levels, although minor fluctuations should still be expected for several months.

Hope in Steel—If the steel industry comes through this month as many officials have predicted, it will go a long way toward halting the general downtrend. Output in the week ended Feb. 23 dropped to 1,373,000 net tons for ingots and castings, reports the American Iron & Steel Institute. It was the worst week since the Christmas holiday.

But output last week showed a mild reversal, rising to an estimated 1,445,000 net tons. The gain may represent a move by the industry to boost business morale. Some of the biggest steel consumers are still holding back on purchases from mills.

Weather or No—One of the surprises during the last two weeks has come from the electric utilities, which took a contraseasonal upturn in mid-February. Output during the week ended Feb. 15, rose to 12.417 billion kw-hr, the highest since the second week in January. Figures from Edison Electric Institute hint that some of this was the result of the nationwide cold spell last month. The Southeast Div. showed the biggest year-to-year gains as many southern homeowners used electric floor heaters. But the fact that the 1958 vs. 1957

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,468[1]	1,373	2,456
Electric Power Distributed (million kw-hr)	12,200[1]	12,417	11,920
Bituminous Coal Output (1000 tons)	7,970[1]	7,460	9,750
Crude Oil Production (daily avg—1000 bbl)	6,850[1]	6,852	7,567
Construction Volume (*ENR*—millions)	$338.5	$208.7	$374.7
Auto, Truck Output, U. S., Canada (*Ward's*)	117,929[1]	128,751	169,083
TRADE			
Freight Carloadings (1000 cars)	530[1]	533	627
Business Failures (Dun & Bradstreet)	319	342	317
Currency in Circulation (millions)[3]	$30,642	$30,675	$30,605
Dept. Store Sales (changes from year ago)[3]	−6%	−8%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,114	$18,686	$25,027
Federal Gross Debt (billions)	$274.4	$274.5	$275.7
Bond Volume, NYSE (millions)	$23.0	$22.0	$13.5
Stocks Sales, NYSE (thousands of shares)	9,201	10,003	6,964
Loans and Investments (billions)[4]	$87.2	$87.1	$84.8
U. S. Govt. Obligations Held (billions)[4]	$26.3	$26.3	$25.7
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	227.10
STEEL's Nonferrous Metal Price Index[6]	201.7	201.0	239.3
All Commodities[7]	118.8[1]	118.8	116.9
Commodities Other than Farm & Foods[7]	125.8[1]	125.8	125.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1958, 2,699,173; 1957, 2,559,490. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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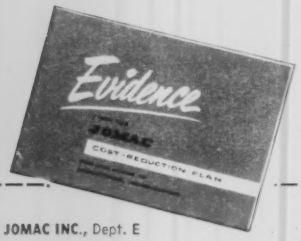

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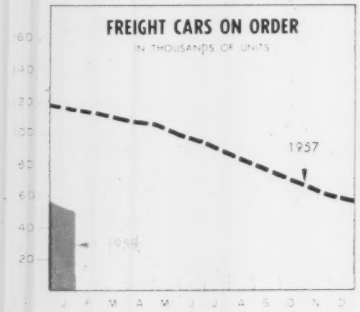
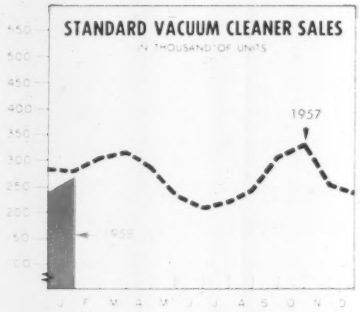
THE BUSINESS TREND





	Awards 1958	Awards 1957	(end of month) 1958	(end of month) 1957
Jan.	401	5,328	48,787	114,656
Feb.	....	6,065	.....	111,965
Mar.	....	5,359	.....	107,708
Apr.	....	6,429	.....	105,190
May	....	3,423	.....	97,006
June	....	4,918	.....	91,810
July	....	1,251	.....	85,229
Aug.	....	3,203	.....	79,258
Sept.	....	3,257	.....	71,981
Oct.	....	2,206	.....	65,718
Nov.	....	1,070	.....	59,194
Dec.	....	3,492	.....	55,941
Total	....	42,051		

American Railway Car Institute.
Charts copyright, 1958, STEEL.

	1958	1957	1956
Jan.	265,489	276,738	302,203
Feb.	.....	300,887	286,386
Mar.	.....	312,746	395,686
Apr.	.....	281,627	352,873
May	.....	231,246	326,008
June	.....	207,286	248,326
July	.....	218,276	259,774
Aug.	.....	241,218	276,932
Sept.	.....	302,869	320,278
Oct.	.....	328,655	371,998
Nov.	.....	251,123	300,381
Dec.	.....	237,501	281,025
Totals	.....	3,190,172	3,721,870

Vacuum Cleaners Mfrs.' Assn.

deficit is shrinking in the important Central Industrial Div. cannot be overlooked.

Little help can be expected from the other two components (freight carloadings and auto assemblies). Auto sales are sluggish, and Detroit schedules are still being cut back. Auto and truck production slumped to 110,274 units during the latest week, says *Ward's Automotive Reports*. Labor difficulties and topheavy dealer inventories will probably push the figure a little lower before there is any firming. (See Page 67.)

Loadings Unchanged—There has been little change in the freight carloading picture for three weeks. Traffic is remaining close to the 530,000 car figure. So far this year, carloadings trail those of the year-ago period by about 17 per cent, reflecting the business downturn in almost every commodity. Particularly weak this year has been the loading of coal. The National Coal Association reports production of bituminous through the middle of February trails the 1958 mark by 19 per cent.

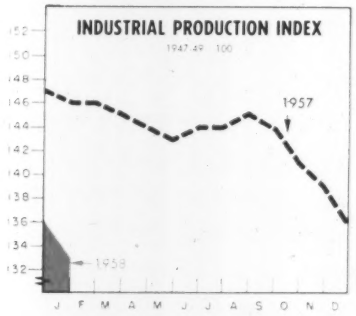
From December to January, STEEL's index dropped about 10 points. From January to February, the drop was only 5 points. If there is a drop from February to March, chances are good it will be only 2 or 3 points.

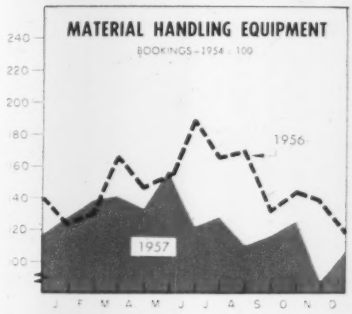
Unemployment Leveling

The employment picture also indicates that the bottom of the dip is close at hand. Layoffs still exceed hirings, but the rate of call-backs has been on the increase lately, slowing down the rate of increase in unemployment.

Stromberg-Carlson Div. of General Dynamics Corp. expects to add nearly 1300 to its payrolls this year. Caterpillar Tractor Co. will return to a five-day week later this month at four of its plants which have been operating four days a week since Jan. 13. Maytag Co. is stepping up its automatic washer production by 20 per cent and increasing its employment by about 100 persons. Thompson Products Co. is recalling 50 to 60 persons at its Jet Div.—but it is laying off about 70 at its automotive plants.

Most of the unemployment headlines center on the auto companies or their suppliers. All major producers have cut back anywhere from a day to a week within the last two weeks. Ford Motor Co. alone laid off over 13,000 workers for varying





(Seasonally Adjusted)

	Total Production 1958	1957	Primary Metals 1958	1957	Metal Fabricating 1958	1957
Jan.	133	146	100	143	160	180
Feb.	...	146	...	143	...	180
Mar.	...	145	...	137	...	179
Apr.	...	144	...	136	...	176
May	...	143	...	132	...	175
June	...	144	...	132	...	177
July	...	144	...	133	...	177
Aug.	...	145	...	136	...	177
Sept.	...	144	...	131	...	174
Oct.	...	141	...	128	...	168
Nov.	...	139	...	121	...	170
Dec.	...	136	...	108	...	164
Avg	...	143	...	132	...	175

Federal Reserve Board. *Preliminary.

	1957	1956	1955	1954
Jan.	126.34	122.43	97.00	93.56
Feb.	139.29	129.56	98.71	96.45
Mar.	140.76	166.14	149.16	115.55
Apr.	132.67	145.20	109.52	122.76
May	157.95	155.53	110.50	98.54
June	121.57	189.13	139.00	112.42
July	128.31	165.50	111.76	91.68
Aug.	110.09	168.70	106.20	94.06
Sept.	116.79	130.35	136.80	88.43
Oct.	124.80	143.38	123.52	95.41
Nov.	87.80	138.50	118.09	88.66
Dec.	105.65	117.76	139.85	102.49
Avg	124.34	147.68	120.01	100.00

Material Handling Institute Inc.

periods in late February. A. O. Smith Corp., the Milwaukee frame supplier, has cut off 600 employees. Electric Auto-Lite Co., Toledo, Ohio, supplier of electric parts, opened four of its plants today after a week of inactivity. The shutdown affected 1800 hourly workers.

Long Range Growth Intact

This business decline may be rougher than the 1953-54 recession, and it may take longer to climb back up "unless the consumer becomes an aggressive buyer of goods," states Tri-Continental Corp., a large New York investment firm. "There is little indication of this increased purchasing at present." (Retail sales through the middle of February lag the year-ago period by 2 per cent, at least partially because of the bad weather.)

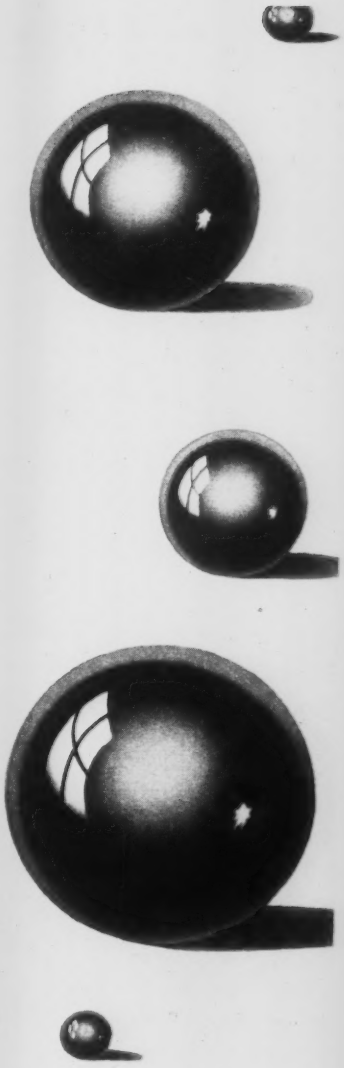
The investment firm makes an interesting point: "Business activity is now at approximately the level called for by the long term growth trend line, calculated at a 3.75 per cent annual increment, after having exceeded this line for several years. While it may well decline below the trend line for some time, as it has often done in the past, continuation of the long term growth should eventually bring a higher level of activity without generating a boom."

Freight Car Orders Down

Domestic freight car orders plummeted to 401 units in January, the lowest point since March, 1954 (347 units), reports the American Railway Car Institute. (See table, Page 72.) But, deliveries increased to 7219 from December's 6174, resulting in a decline in the backlog to 48,787 as of Feb. 1.

Trends Fore and Aft

- Vacuum cleaner sales in January moved to 265,489 units, the highest level since October and nearly equal to the year-ago figure (see chart, Page 72).
- New orders for machine tools came to about $20 million in January, almost unchanged from the December figure, says the National Machine Tool Builders' Association. Shipments dipped to about $46 million, resulting in another cut in the already slim backlog. One industry official, who has been pretty accurate in his analysis of the current slump, feels that net orders in February may rise to about $25 million.



COOLIDGE
Balls

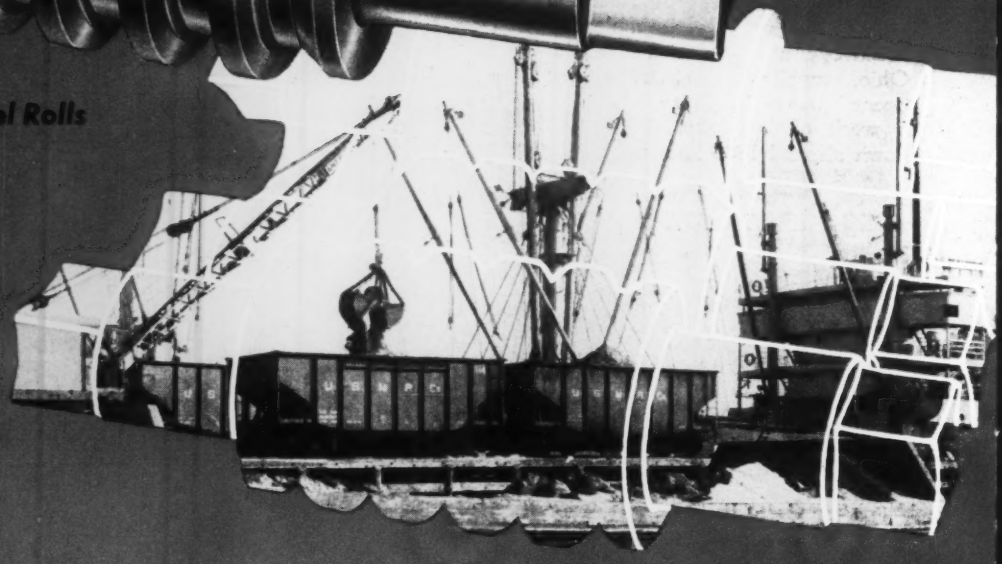
CHROME ALLOY
AND
STAINLESS

COOLIDGE CORPORATION
MIDDLETOWN, OHIO

Ohio Rolls

Ohio Iron and Steel Rolls

- Carbon Steel Rolls
- Ohioloy Rolls
- Ohioloy "K" Rolls
- Flintuff Rolls
- Double-Pour Rolls
- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nioloy Rolls
- Forged Steel Rolls



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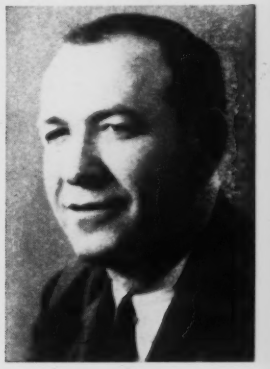


FRANK H. CONANT
Riverside-Alloy Metal sales

William H. Manning was elected executive vice president, **Judson Steel Corp.**, Emeryville, Calif. **T. A. Maas Jr.** succeeds Mr. Manning as secretary.

Addison S. Farrell was appointed production superintendent of the **Olin Aluminum Div.** rolling mill, Olin Mathieson Chemical Corp., under construction between Clarington and Hannibal, Ohio. Prior to joining Olin Mathieson, Mr. Farrel was with Kaiser Aluminum & Chemical Corp.

Ronald N. Campbell, formerly president, Bryant Mfg. Co., division of Carrier Corp., was elected a vice president of **Westinghouse Electric Corp.**, Pittsburgh, and president of its subsidiary, **C. A. Olsen Mfg. Co.**, Elyria, Ohio.

T. W. Helwig was made group executive in charge of two divisions of **Young Spring & Wire Corp.**—Daybrook Hydraulic Div., Bowling Green, Ohio; and Ottawa Steel Div., Ottawa, Kans. **Edwin L. Johnson** continues as general manager, Ottawa.

William F. Wilson, executive vice president - general manager, **Gear Grinding Machine Co.**, Detroit, assumes executive duties of **Edgar D. Leon**, who resigns as president.

Richard L. Terrell was promoted to administrative assistant to the general manager, **Electro-Motive Div.**, General Motors Corp., La Grange, Ill. He succeeds **George W. Elsey**, retired. **Raymond H. Bish** succeeds Mr. Terrell as work manager.

Charles E. Peters was appointed plant manager, **Beatty Machine & Mfg. Co.**, Hammond, Ind. He was previously associated with divisions of U. S. Industries Inc. and Hotpoint Co.

William F. S. Dowlding was appointed director of quality control for **Long Mfg. Div.**, Detroit, Borg-Warner Corp. Formerly technical assistant to the president, he succeeds **Leo W. Cartier**, who transferred to another Borg-Warner division.

H. R. Edelman Jr., president, **Heyl & Patterson Inc.**, Pittsburgh, was also elected chairman. **E. W. Kahle** was made executive vice president-general manager; **J. F. Page**, vice president-treasurer; **H. R. Edelman III**, secretary; **W. J. Frank Jr.**, controller.

Raymond Wise was made sales manager, **H. P. Townsend Mfg. Co.**, Hartford, Conn. He was with Cleveland Tapping Machine Co., which merged with Townsend two years ago.

Cannon Engineering Co., Los Angeles, appointed **Roger Bowen** to its central staff as director of engineering. He was general manager of the Salem, Mass., division, and is succeeded by **James H. Cannon Jr.**, former production manager in Salem.

E. F. Greiwe was made manager of **Allis-Chalmers Mfg. Co.'s** centrifugal pump department, Norwood, Ohio, Works. He succeeds **M. L. Murdock**, resigned.

Frank H. Conant was named general sales manager, **Riverside-Alloy Metal Div.**, Riverside, N. J., H. K. Porter Company Inc. He was manager of distributor and warehouse sales. He joined Riverside early in 1956 after several years as sales manager at Spencer Wire Corp.

William L. Parlon was made sales manager, **Onsrud Cutter Mfg. Co.**, Libertyville, Ill.

Mario DiFederico was appointed vice president-sales, **Firestone Steel Products Co.**, Akron. He is succeeded as Akron factory manager by **Robert J. Loeven**, former plant superintendent.

Paul W. Christensen Jr. was elected president of **Cincinnati Gear Co.**, Cincinnati. He succeeds his father, **P. W. Christensen**, who becomes chairman and treasurer. New vice presidents are: **Lester A. Edwards**, sales; **Anthony J. Lucas**, engineering; **Walter L. Rye Jr.**, manufacturing.

Harold E. Erf, former manager of sales administration, **Sterling Grinding Wheel Co.**, Tiffin, Ohio, was made Chicago district sales manager.

Kenneth J. Butler was appointed assistant sales manager, springs and formed wire department, **Wickwire Spencer Steel Div.**, Colorado Fuel & Iron Corp. He is at Palmer, Mass.

Ansul Chemical Co. appointed **James B. Reed** manager of its De-

CARL L. SADLER

RICHARD H. OLSON

Sundstrand Machine Tool vice presidents

THOMAS H. PIKE JR.

JOHN E. CHUMBLEY

Tube Turns division vice presidents

troit operations (fire equipment sales).

Carl L. Sadler, general manager, Sundstrand Aviation Div., **Sundstrand Machine Tool Co.**, at Rockford, Ill., was elected vice president of the division. **Richard H. Olson**, general manager of the former aviation division at Denver, was elected vice president in charge of the new Sundstrand-Turbo Div. It includes the Denver operation and American Machine & Foundry Co.'s former turbo division at Pacoima, Calif., which Sundstrand recently acquired.

Dr. Clyde E. Arntzen was made manager; **S. A. Rosecrans**, assistant manager, materials engineering department, **Westinghouse Electric Corp.**, Pittsburgh.

Daniel T. Bucchioni was made assistant purchasing agent, **International Business Machines Corp.** He is in charge of manufacturing purchasing for the military products division plant at Owego, N. Y.

Vance T. Wray was made manager of **Chrysler Corp.**'s McGraw Stamping Plant, Detroit.

David G. Pettigrew was made manager of the Baltimore branch of **Whitehead Metal Products Co. Inc.**, New York. He is replaced as Philadelphia sales manager by **John Marple. Carl S. Newmarch** leaves his post in New York as product manager of stainless steels to become assistant branch manager-Philadelphia. **Robert W. Marriott**, in charge of stainless steels in the Philadelphia area, transfers to New York as product manager-stainless steels.

Thomas H. Pike Jr. and **John E. Chumbley** were appointed division vice presidents of **Tube Turns**, a division of National Cylinder Gas Co. at Louisville. Mr. Pike is in charge of planning. Mr. Chumbley is in charge of general sales operations.

Dr. F. G. Singleton was promoted to vice president-research, **H. H. Robertson Co.**, Pittsburgh.

United States Steel Corp. appointed **E. H. Gott** vice president-production, steel producing divisions, to succeed **Walter F. Munford**, now executive vice president-engineering and research. **Oscar Pearson** succeeds Mr. Gott as vice president-steel operations. **E. B. Speer**, former general superintendent-Fairless Works, succeeds Mr. Pearson as general manager-steel operations. **James C. Gray** was made administrative vice president-raw materials; **R. M. Lloyd**, administrative vice president-international and raw materials staff; **M. D. Millard**, administrative vice president-international. **J. F. Core** succeeds Mr. Gray as vice president-coal operations.

R. E. Groethe, formerly manager of the metallurgical department, Corning Glass Works, joined the metallurgical department of **Jessop Steel Co.**, Washington, Pa.

Melvin R. Schuster was appointed manager of **Aluminum Co. of America's** branch sales office at Youngstown. He succeeds **G. Keith Shook**, now in Pittsburgh as Alcoa's manager of extruded shape sales. **William H. Derry** was made manager, Jackson, Mich., branch sales office, to succeed **Richard Ladner**, transferred to Lancaster, Pa., Works as manager of fastener and screw machine products sales.

Earl L. Fester was made general manager and **Davis Spencer** sales manager of the **Miehle-Dexter Supercharger Div.**, Christensen Machine Co., Racine, Wis.

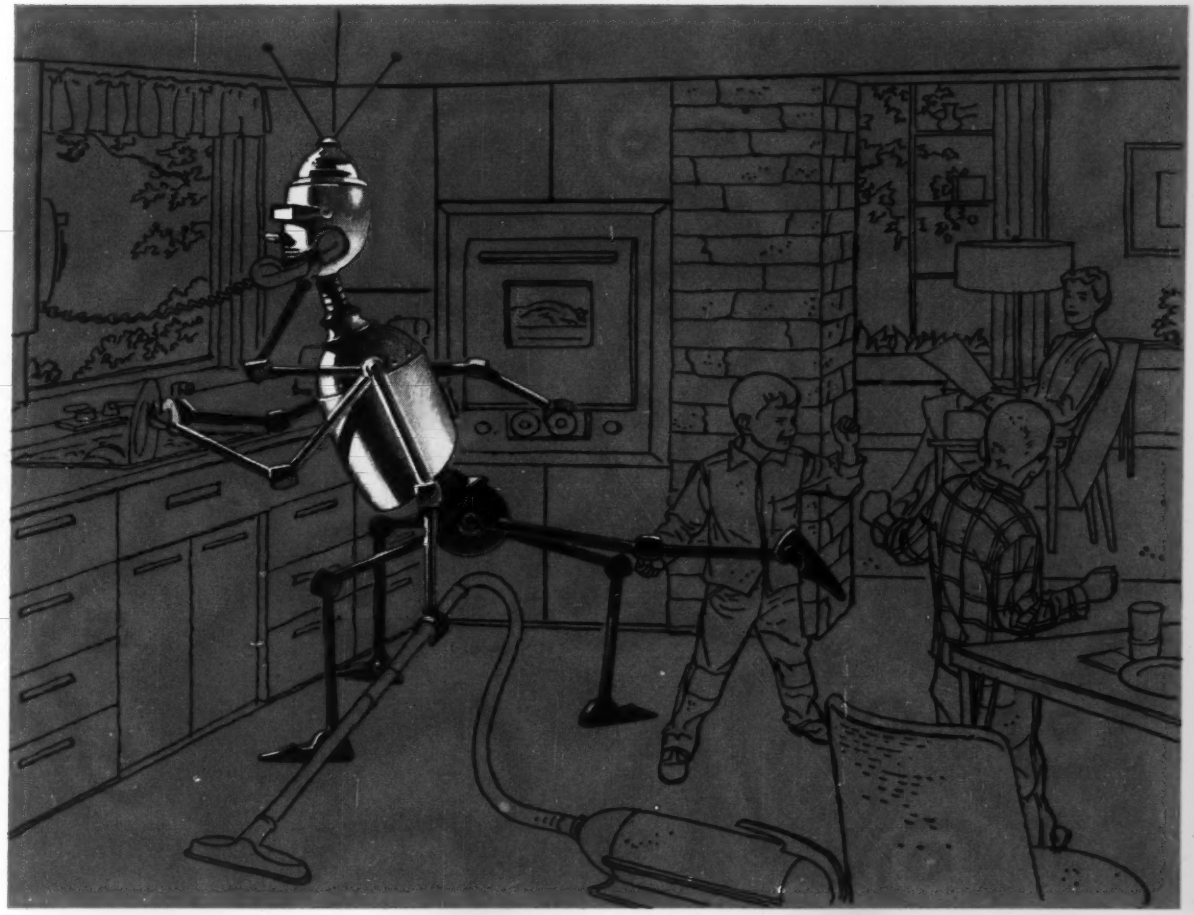
Robert W. Tobey was promoted to

E. H. GOTT

OSCAR PEARSON

E. B. SPEER

steel operations executives at United States Steel



No matter what you make from Cold Rolled Steel

An ALAN WOOD Representative can help!

If you produce this gadget . . . housewives will love you. Your market would be endless. But there would be problems about the kind of steel to use. Better call your A.W. Representative. Your A.W. Representative may order a metallurgical study of your problems and bring about savings that build new profits and increased production. He can provide you with the latest information on cold rolled steel and its application, plus experienced advice on the gauge, size and type to order. Call him today. Your A.W. Representative is always available . . . never out of touch with your location.

IRON PRODUCTS
"Swede" *pig iron*

STEEL PRODUCTS
Plates (sheared)
A.W. Dynalloy (high strength steel)
Hot rolled sheets
Hot rolled strip
Cold rolled sheets
Cold rolled strip

ROLLED STEEL FLOOR PLATE
A.W. ALGRIP *abrasive*
A.W. SUPER-DIAMOND *pattern*

COAL CHEMICALS

A.W. CUT NAILS
Standard & Hardened

MINE PRODUCTS
Iron ore concentrates
Iron powder
Crushed stone
Sand

COKE
Foundry, industrial & metallurgical

PENCO METAL PRODUCTS DIVISION
Steel cabinets, lockers & shelving

ALAN WOOD STEEL COMPANY

steelmasters for more than a century and a quarter • CONSHOHOCKEN, PA.

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia
New York • Los Angeles • Atlanta • Boston • Buffalo • Cincinnati
Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul
San Francisco • Seattle
Montreal and Toronto, Canada—A. C. Leslie & Co., Limited

A. JOHN WARD
Warner Electric div. mgr.

RICHARD F. ARMITAGE
gen. supt.-Republic dist.

W. E. BECHTEL
McKinney production supt.

DAVID P. REYNOLDS
Reynolds exec. v. p.

manager of **Trane Co.**'s Pittsburgh sales office.

A. John Ward was named manager, automotive products division, **Warner Electric Brake & Clutch Co.**, Beloit, Wis. He was manager of the direct current products department of Reliance Electric & Engineering Co.

Richard F. Armitage fills the new post of general superintendent of **Republic Steel Corp.'s** Warren, Ohio, district. He was superintendent of construction.

Jay G. Oesterle was made sales promotion manager of **Titeflex Inc.**, Springfield, Mass., a subsidiary of Atlas Corp.

Norman F. Luekens was elected president, **Geo. Worthington Co.**, Cleveland. He succeeds **A. G. Rorabeck**, now chairman.

At **Kaiser Aluminum & Chemical Corp.'s** recently established electrical conductor division in Chicago, **J. C. Ferguson** was made product manager; **R. J. Harrison**, assistant product manager; **H. F. Johnson**, administrative manager.

Clifford D. McGuinn was made vice president-field operations, NCG Div., **National Cylinder Gas Co.**, Chicago.

Francis E. Holland was appointed assistant sales manager, **Butterfield Divisions**, Union Twist Drill Co., at Derby Line, Vt., and Rock Island, Que.

Jack Vissman was made sales manager, industrial slide division, **Grant Pulley & Hardware Corp.**, West Nyack, N. Y.

W. E. Bechtel was made production superintendent, **McKinney Mfg. Co.**, Pittsburgh. He was general foreman.

Vesuvius Crucible Co., Swissvale, Pa., elected **Theodore H. Harley** president to succeed **Arthur J. Jackman**, now vice chairman.

Allan G. Sheppard was named vice president in charge of engineering and dvelopment of **American LaFrance Corp.**, Elmira, N. J.

Wilton O. English was made division manager, flange and forging division, **Phoenix Mfg. Co.**, Catasauqua, Pa. He was plant manager.

E. B. Smiley was made sales manager, **Overton Gear & Tool Corp.**, Addison, Ill. He recently resigned as vice president-sales manager of Illinois Gear & Machine Co.

James D. Kreager was promoted to sales manager, **Engelberg Huller Co. Inc.**, abrasive machine division, Syracuse, N. Y.

Samuel A. McMullan was named manager of sales and engineering, Ft. Madison division, **Anchor Metals Inc.**, Hurst, Tex.

George H. Dennison was appointed general manager-sales, **Keystone Abrasive Wheel Co.**, Carnegie, Pa. He was a district sales manager for Carborundum Co.

Clarence Dykstra was made sales manager, **Spanmaster Crane Div.**, Jervis B. Webb Co., Detroit.

Eagle Metals Co., Seattle, elected **C. B. Holder** vice president-sales manager.

David P. Reynolds, vice president-sales, was elected an executive vice president of **Reynolds Metals Co.**, Richmond, Va.

Esmonde J. Bushey was made assistant works manager, **Union Twist Drill Co.**, Athol, Mass., division. He succeeds **Clyde N. Simpson**, now Detroit district manager.

Earle W. Rearwin, formerly in charge of research and development for Precision Castings Co., joined **Reed-Prentice Div.**, Package Machinery Co., Worcester, Mass., as diecasting engineer.

Edwin A. Link was elected president, **General Precision Equipment Corp.**, New York.

Arthur J. Williamson succeeds **Harry Resnick**, retired, as general manager, Universal Steel Co., Cleveland. Mr. Williamson was president of Tube Reducing Corp.

OBITUARIES...

William F. Powell, 59, superintendent, electric melting department, at the **Sanderson - Halcomb Works**, Syracuse, N. Y., Crucible Steel Co. of America, died Feb. 17.

Frank Dengler, purchasing agent, **International Resistance Co.**, Philadelphia, died Feb. 20.

Raymond L. Morissey, 60, manager of manufacturing engineering, engine division, **Ford Motor Co.**, Dearborn, Mich., died Feb. 17.

Harry J. Ekelund, 40, controller of the supplies division, **International Business Machines Corp.**, New York, died Feb. 17.

Here it is...

BRANDED for lifetime identification

HOW IT'S DONE—The mark is embossed onto, not stamped into, the link. The Make and Grade appear alternately at approximately 10" intervals along the chain opposite the weld and on only one side of the link.

Identification of chain should be ***permanent.*** Colored paint and tape are useful identification marks while chain is moving through distribution channels, but these marks soon disappear after the chain is put to use. That is when identification becomes most important from safety and service standpoints. Permanent marks are the answer. You now get them on CM chain.

Exclusively CM

No other chain offers this valuable feature . . . and you get it at no extra cost

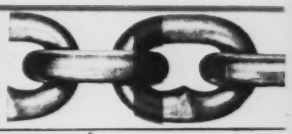
CHAIN BUYERS—Now you can tell at a glance, today or months later, the specific make of chain purchased.

CHAIN USERS—Now you can be sure of the grade (strength) of the chain you are using . . . a definite safety advantage.

DISTRIBUTORS—Now you can positively identify chain sold by you.

PLUS COLOR MARKS

at exact 5 foot intervals for quick identification and fast, ***accurate*** measuring.



GRADE	Permanent* Mark	COLOR MARK
Proof Coil Chain	PC or P	GREEN
BBB Chain	3B	RED
High Test Chain	HT	BLUE
Herc-Alloy Chain	A	ORANGE

*This permanent branding is presently available on above grades in all sizes under ½".

SPECIFY CM INSWELL FOR THE BEST OF EVERYTHING IN CHAIN

CM HOISTS AND CHAIN

COLUMBUS McKINNON CHAIN CORPORATION
TONAWANDA, NEW YORK

REGIONAL OFFICES: NEW YORK • CHICAGO • CLEVELAND
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In Canada: McKinnon Columbus Chain Limited, St. Catharines, Ontario

HERC-ALLOY® CM®

When you buy from Ohio Seamless

YOU PRESS THE BUTTON
OHIO SEAMLESS
DOES THE REST

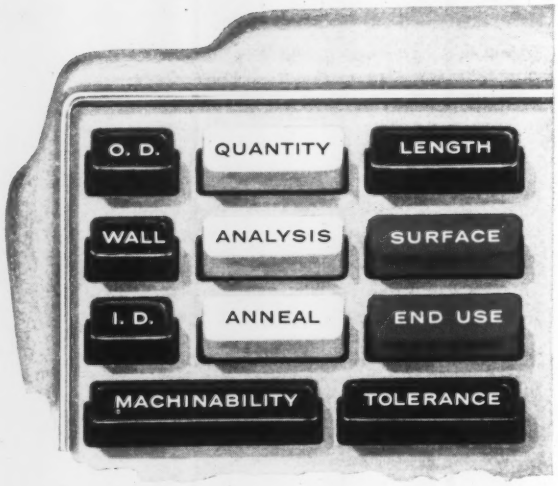
Buying steel tubing from Ohio Seamless doesn't cost—it *pays*. Our minimum quantities are generally smaller than you may realize . . . often as small as 100 to 150 feet, in certain seamless grades and sizes.

When you buy from us, you're dealing with tubing *experts* . . . men who can recommend the *exact* Ostuco Tubing to suit your product and processes. There's no compromise on analysis, size, anneal, etc.

Advantages of buying from Ohio Seamless multiply, the closer you examine them. Our single-source service eliminates headaches of interplant shipments . . . possible errors . . . multiple purchase orders and invoices. Ohio Seamless keeps your production lines humming because you get *precisely what you want.*

For proof, contact our nearest sales office or the plant at *Shelby, Ohio—Birthplace of the Seamless Steel Tube Industry in America.*

AA-7116



SALES OFFICES: BIRMINGHAM • CHARLOTTE • CHICAGO (Oak Park) CLEVELAND • DAYTON • DENVER • DETROIT (Ferndale) • HOUSTON LOS ANGELES (Lynwood) • MOLINE • NEW YORK • NORTH KANSAS CITY PHILADELPHIA (Wynnewood) • PITTSBURGH • RICHMOND • ROCHESTER ST. LOUIS • ST. PAUL • ST. PETERSBURG • SALT LAKE CITY • SEATTLE TULSA • WICHITA

CANADA: RAILWAY & POWER ENGR. CORP., LTD.

EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY
225 Broadway, New York 7, New York

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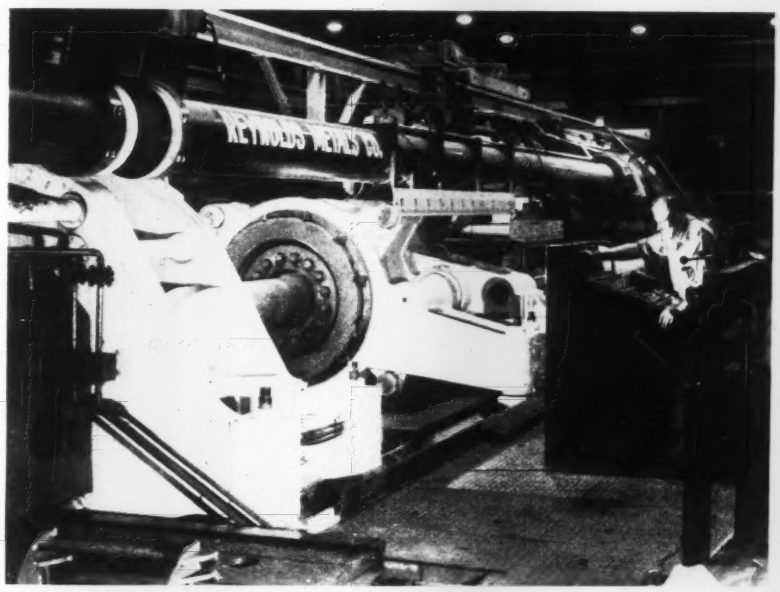
OSTUCO SHELBY, OHIO
OSTUCO TUBING
1908 1958

OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company SHELBY, OHIO

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging



Reynolds Metals operates Loewy-designed press for Navy

Extrudes Aircraft Shapes

THIS HUGE extrusion press, installed in the Reynolds Metals Co. plant at Phoenix, Ariz., will be used to extrude aircraft shapes and other defense materials for the U. S. Navy. It weighs 2 million lb, is 90 ft long, has a press capacity of 6300 tons, and cost $2.5 million.

Although the unit is one of the largest of its kind in operation, it requires but two men to operate it. The major portion of the operation is handled from the control board pictured while another man sits at a similar control board on the other side of the press.

Aircraft Shapes—Built by Loewy-Hydropress Div., Baldwin-Lima-Hamilton Corp., New York, the press is designed for closest concentricity. Shifting from low to high speed can be done easily without changing valves. By pushbutton, the operator can switch from the working of nonferrous metals to the extrusion of steel.

Special Features—Change of containers, which in conventional extrusion presses requires many hours, can be performed in 20 to 30 minutes on this press. Another innovation is an independent mandrel mover. The mandrel can be stopped independently of the press movement, making it possible to extrude shapes of unusual design, such as small, hollow configurations.

The press is equipped with an automatic constant-speed control, an automatic billet loading system, and a semiautomatic butt and dummy block handling device. It is designed also for the application of rectangular containers for extremely wide and thin extrusions. A special device provides for the handling of split dies for step extrusion. The height of the run-out table (as a whole unit) can be adjusted to the different die configurations.

PIC Acquires Tool Line

PIC Design Corp., East Rockaway, N. Y., acquired a precision tool component line from Von Industries Inc., Mineola, N. Y.

Forms Foreign Sales Dept.

Rolled Steel Corp., Skokie, Ill., distributor of steel sheets, bars, plates, angles, and structurals, has established a Foreign Sales Dept. The department was set up in anticipation of the opening of the St. Lawrence Seaway, which will enable midwestern warehouses to compete favorably with east coast exporters. The company has made shipments to Canada and three other foreign countries and has contacted steel users in 20 foreign countries.

Installs Sendzimir Mill

Wallingford Steel Co., Wallingford, Conn., has installed a second Sendzimir mill which permits production of strip in widths up to 27 in. and as thin as 0.001 in. Products will include thin gage strip for special applications such as turbine engines, guided missiles, and aircraft components.

Boosts Pipe Production

Production is expected to get underway this month in a $5-million steel pipe mill of Page-Hersey Tubes Ltd. at Welland, Ont. It will turn out pipe in sizes ranging from 2.375 to 8.625 in. It is the company's eighth pipe and tubing mill at Welland and the second to produce steel pipe by the electric resistance weld method.

Lewis-Shepard Expands

Lewis-Shepard Products Inc., Watertown, Mass., has added over 75,000 sq ft of floor space to its production facilities in that city. The company makes electric fork lift trucks and related material handling equipment. The new facilities are in full operation.

Enters Solid Fuel Field

HEF Inc. has been formed jointly by Hooker Electrochemical Co., Niagara Falls, N. Y., and Foote Mineral Co., Philadelphia. The new firm will specialize in the manufacture of components of solid fuels for rockets and guided missiles.

Kennecott Buys Property

Kennecott Copper Corp., New York, purchased Consolidated Coppermines Corp.'s mining properties in White Pine County, Nevada. The sale includes Consolidated Coppermines Tripp Pit, its holdings in Kennecott's adjacent Liberty and Veteran Pits, numerous mining claims, water rights, surface build-

(*Please turn to Page* 84)

Announcing STEEL's COST CRISIS

A Cost-Critical Year

Metalworking is facing its most challenging crisis since World War II. It's the COST CRISIS —created by leveling or shrinking sales volume, greater resistance to price increases, and continuing upward cost pressures.

Are You Beating the Cost Crisis?

Has your company achieved an important saving in unit production costs through more efficient use of capital equipment? Your success can bring national recognition to you, your production team, and your company. All you need to do is tell us about it.

Editors Launch Nationwide Search

. . . to highlight the need for intelligent cost cutting of this type, and to show readers how it's being done, STEEL's editors are looking for dramatic examples. The best entries will be reported in STEEL.

Special Honor for the 'Top Ten'

A distinguished panel of 100 STEEL readers will select the "Top Ten" published entries. *Production Efficiency Awards* will be presented to the president of each winning company for encouraging production, engineering, and purchasing supervisors to find ways to cut production costs through more efficient equipment.

Entries will be classified by plant size. Two *Production Efficiency Awards* will be made in each of these groups:

Plants employing under 100
Plants employing 100 to 249
Plants employing 250 to 499
Plants employing 500 to 999
Plants employing 1000 or more

Your entry competes against only those from plants of equal size.

You May Qualify for an Award

. . . if you are a full-time employee of a metal producing or metalworking plant

. . . if you participated in the unit production cost saving project

. . . if your project was completed since Jan. 1, 1952 . . .

AWARDS

Competition

To find new ways to lower unit production costs through efficient use of new or improved capital equipment.

Send for Your Awards Kit Today . . .

It is designed to simplify your job of preparing an entry. Included are a questionnaire on which you can submit your answers and a folder in which you can mail your entry to us. Here are the questions you'll have to answer:

1. **WHAT WAS THE COST PROBLEM?** (Tell what product is being made, what production operations are involved in the cost reduction, and how you discovered cost-cutting possibilities. For example, was it part of a plant cost program, the result of vender information, or an employee suggestion?)

2. **WHAT WAS THE PRODUCTION SEQUENCE BEFORE THE IMPROVEMENT? WHAT IS IT NOW?** (Include a description of equipment improvements or purchases made, tooling alterations, material changes, or other steps that influenced the unit production cost.)

3. **WHAT ARE THE "BEFORE" AND "AFTER" UNIT PRODUCTION COSTS?** (If these figures are not available, tell what percentage of the old cost is being saved. If the change brought other gains, such as production rate or part quality, tell us about them.)

4. **IF YOUR PROGRAM TOOK SEVERAL STEPS, WHICH WAS MOST RESPONSIBLE FOR THE SAVING?**

5. **HOW DID YOU SELL THE PROPOSED IMPROVEMENTS TO MANAGEMENT AND GET THE NECESSARY FUNDS?** (Include, where possible, the dollar investment needed.)

Send us action photographs of the production operation or equipment and any drawings necessary to describe the improvement.

Be sure to give us your name, title, and the number of employees in your plant.

Entries Must Be Simple, Factual

All entries will be judged on the factual presentation of the case study. Elaborate entries are discouraged. All that's required are straightforward answers to the Awards Kit questionnaire.

Your Entry Can Be a Winner

To get your Awards Kit by return mail, write today to:

Cost Crisis Editor
STEEL
PENTON BUILDING
CLEVELAND 13, OHIO

All entries must be postmarked no later than June 15, 1958.

HAVE YOU TRIED THIS EXTRAORDINARY CLEANER?

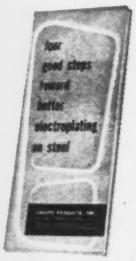
Oakite Rustripper removes rust and heat scale in the same operation that removes oil. It avoids hydrogen embrittlement, damage to machined surfaces and other disadvantages of acid pickling.

Have you taken the four good steps?

How can cleaning costs be reduced 33% while cleaning quality is being improved? *See pages 7 and 8 of booklet.*

What are four easy ways to improve the average rinse tank? *See page 10.*

What causes hydrogen embrittlement during electrocleaning? What is the remedy? *See pages 15 and 16.*



Do you need a brass cleaner that gives better protection against tarnishing?

Oakite has a new brass cleaner that provides scientific protection against the oxygen that tarnishes brass and other copper alloys during the application of reverse current.

"It cut our cleaning rejects by more than 90%"

says a manufacturer who found that Oakite Composition No. 95 gave him:

BRIGHTER PLATING—All films removed . . . no residues, no undersurface shadows, no anodic blackening, nothing to impair the brightness of the electroplate.

FEWER REJECTS—Major causes of blistering and peeling eliminated . . . Consistent success in baking for 60 minutes at 300°F.

OAKITE PRODUCTS, INC.
34E Rector Street, New York 6, N. Y.

Send me the FREE booklets indicated below:

- ☐ Here's the best shortcut in the field of electroplating
- ☐ Four good steps toward better electroplating on steel
- ☐ What's NEW for electrocleaning brass and other copper alloys
- ☐ Good news about electrocleaning zinc-base die castings

NAME _____

COMPANY _____

ADDRESS _____

FREE
For further information, ask for booklet

OAKITE

Technical Service Representatives in Principal Cities of U.S. and Canada

(*Concluded from Page 81*)

ings, equipment, the company-owned community of Kimberly, and other real estate. Coppermines retains its other interests.

Coppermines production has been averaging 9000 tons of ore per day, including 2000 tons from Kennecott. Kennecott's production has been about 12,000 tons of ore per day. Kennecott expects to continue to process 21,000 tons of ore per day.

Organizes Instrument Firm

Robert Haskins organized Dynavia Engineering Corp. in Palo Alto, Calif. The firm will specialize in manufacturing instruments and controls for commercial and military aviation. Mr. Haskins is the founder of Flight Research Engineering Co., Richmond, Va.

Canadian Firm Renamed

L. A. Young Industries of Canada Ltd., Windsor, Ont., changed its name to Young Spring & Wire Corp. of Canada Ltd. The firm is a wholly owned subsidiary of Young Spring & Wire Corp., Detroit.

Makes Solid Propellents

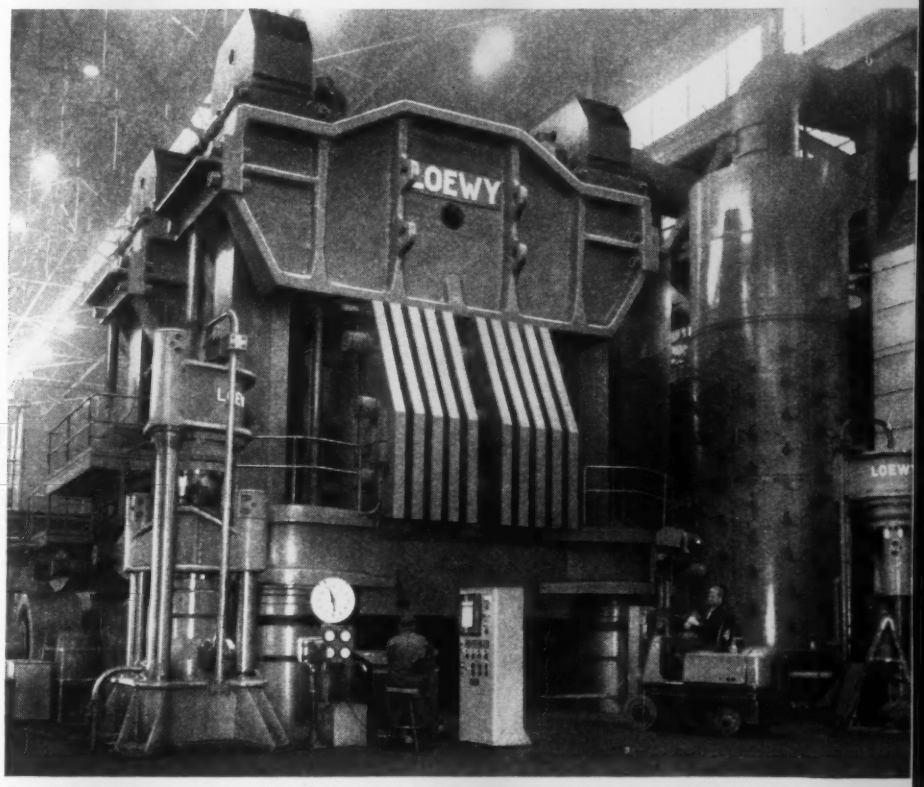
Astrodyne Inc., McGregor, Tex., has been organized to specialize in solid propellent activities. It is owned jointly by North American Aviation Inc. and Phillips Petroleum Co. Officers are: President, J. L. Atwood; vice president, R. W. Thomas; treasurer, R. A. Lambeth; and secretary, Paul J. Parker.

NCG Realigns Divisions

National Cylinder Gas Co., Chicago, has realigned its diversified activities into seven divisions, each with its own president and operating organization. J. L. Adank is president and Fred C. Heppel is executive vice president of the NCG Div., Chicago. W. Roberts Wood is president of Girdler Construction Div., Louisville. John E. Slaughter Jr. is president and Lyman L. Dawson, vice president, of Girdler Process Equipment Div., Louisville. Walter H. Girdler Jr. is president of Chemical Products Div., Chicago. Presidents of three divisions which continue as now constituted

Can you automatically control speeds from 1/4 in./min. to 50 in./min. on your water-hydraulic press?

With Loewy's new automatic program speed control you can



One of the largest presses in existence, this closed die forging press designed and built by Loewy, and in operation at the Wyman Gordon plant, North Grafton, Mass., features automatic program speed control.

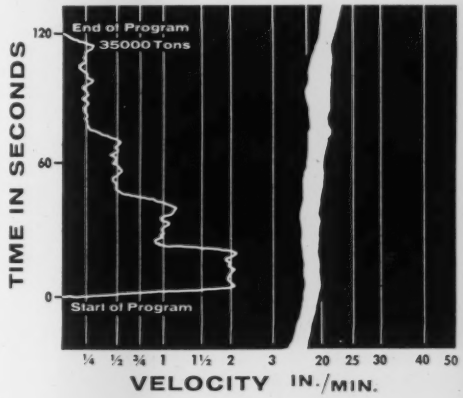
Structural and machine parts in aircraft, missiles and nuclear apparatus today demand greater strength and resistance to high temperatures, and many have extremely thin areas. Machining and other metal removing processes are not economical, due to the high cost of labor, waste of expensive alloy material, and loss of structural strength from cutting across the flow lines of metal. New metals, new methods and new equipment are needed for the economical production of parts that will consistently meet the severest requirements.

Regardless of which metal process is employed—extrusion, forging, die forging or deep drawing—the sound flow of material depends on so many variables that it becomes exceedingly difficult to coordinate them manually, especially in repeat performance. Excessively high speed may result in tears and uneven filling of die cavities. Unduly low speed may cause uneven cooling of material and, hence, interruption of the forming cycle.

To solve the problems of automatically controlling water-actuated hydraulic presses, Loewy-Hydropress had to bring to bear not only its resources in metallurgy and process engineering, but also its unique facilities in design of electronic controls.

The result is equipment which programs the change of speed and pressing force at preselected positions of the press stroke in existing installations. This makes it possible to translate experience in the production of high-quality metal parts into automatic repeat performance on any size hydraulic presses, including even the largest water-actuated presses, where such control was before unthinkable. Also it limits the maximum pressing force to a preset value and thus protects the tooling against overload.

For detailed information on the plastic forming of metals and on automatic controls for any machine process, write us today, Dept. B-3.



Graph shows a typical automatic control cycle consisting of four preselected speeds at preselected stroke positions up to 2 in./min. The workpiece is a 36-in. diameter steel billet. Pressure ranges from 6000 to 35,000 tons. Speeds range from ¼ in./min. to 2 in./min. and total pressing time is 2 minutes.

Loewy-Hydropress Division

BALDWIN · LIMA · HAMILTON

111 FIFTH AVENUE, NEW YORK 3, N.Y. Rolling mills • Hydraulic machinery • Industrial engineering

BALDWIN BLH LIMA-HAMILTON

How your truth dollars help keep the Reds in the red

• The truth dollars you give to Radio Free Europe help keep truth on the air behind the Iron Curtain.

And the truth is an enormously disruptive force to the Reds. For it keeps their captive people thinking . . . wondering . . . and less than completely dominated. The truth keeps needling the Reds. Breaks through their monopoly of lies. Keeps them unsure. Off balance. And thus the truth keeps up to forty fully armed Red divisions tied up policing Russia's satellite countries. Forty divisions, mind you, that might otherwise be put to more aggressive use elsewhere . . . and who knows where?

Your truth dollars keep the 29 super-powered transmitters of the Radio Free Europe network on the air . . . broadcasting the truth behind the Iron Curtain . . . every hour of every day.

Why *your* truth dollars?

Because Radio Free Europe is a private, non-profit organization supported by the voluntary contributions of American business and the American people. And *your* dollars are urgently needed to keep it on the air . . . to help operate its transmitters, pay for its equipment and supplies, and its scores of announcers and news analysts in 5 languages.

Help keep the Reds in the red. Send your truth dollars to Crusade for Freedom, care of your local postmaster.

FREEDOM IS NOT FREE!

Your Dollars Are Needed To Keep Radio Free Europe On The Air

SEND YOUR TRUTH DOLLARS TO

CRUSADE for FREEDOM

CARE OF YOUR LOCAL POSTMASTER

PUBLIC SERVICE ADVERTISING COUNCIL

are: John G. Seiler, Tube Turns, Louisville; James S. Kerwin, Pennsylvania Forge Co., Philadelphia; and Paul J. Charrin, Perforating Guns Atlas Corp., Houston. The company also announced the formation of a foreign subsidiary, NCG International, with Fred C. Heppel president.

Broadens Equipment Line

Rights to a high speed filler have been purchased by the Girdler Process Equipment Div., National Cylinder Gas Co., Chicago, from Librascope Inc., Glendale, Calif. The machine broadens the Girdler division's line of continuous processing and heat transfer equipment used in the food, chemical, and other industries. The machine will be manufactured in Louisville.

Vidmar Inc. Opens Plant

Vidmar Inc., a recently created division of Volkert Stampings Inc., Queens Village, N. Y., will occupy a 44,000 sq ft plant being constructed at Williamsport, Pa. Vidmar will make metal storage equipment. The parent company manufactures precision metal stampings for the electronics industry.

Aeronutronic To Expand

Aeronutronic Systems Inc., a subsidiary of Ford Motor Co., is expanding its facilities at Newport Beach, Calif. Buildings to be erected will provide more than 500,000 sq ft of floor space and working area for 3000. They will include: General offices, aerodynamics and propulsion, space and weapon systems, electronics and computers, prototype manufacturing, and auditorium and library. The subsidiary has been organized to do long range research and development on missiles and rockets.

Enters Missile Field

Sundstrand Machine Tool Co., Rockford, Ill., has entered the guided missile field through the purchase of Turbo Div., American Machine & Foundry Co., Pacoima, Calif. The division designs and develops accessory power supplies for guided missiles. Turbo will be integrated with Sundstrand's aircraft

from CONTINENTAL
a lustrous new
TINNED WIRE

Here's smoothness and luster you rarely get in tinned wire. Continental's special technique makes possible an enduring, uniformly bright finish . . . a wire so bright that it can replace plated wire on many products. It retains its brightness for long periods of time in normal use. Continental tinned wire meets your needs for quality and workability and is available in almost any temper and analysis in medium low carbon and low carbon steels.

FINE—16 gauge through 30 gauge, in 8" diameter coils
COARSE—20 gauge through 5/16", in 16" and 22" diameter coils.

For smooth beauty and high degree of perfection in wire, you will want to investigate Continental Tinned Wire. Write or Telephone—today; or return coupon below.

FILL OUT AND RETURN COUPON TODAY

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____
☐ Send Complete Details ☐ Have Salesman Call

CONTINENTAL STEEL
CORPORATION • KOKOMO, INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame Sealed, Coppered, Tinned, Annealed, Liquor-Finished, Bright and special shaped wire. Also Welded Wire Reinforcing and Galvanized Fabric, Nails, Continental Chain Link Fence, and other products

new shock-absorber

chipping hammers
by Ingersoll-Rand

Ingersoll-Rand has done it again—introduced a "shock-absorber" chipping hammer. Here are a few of the advantages this new concept in hammer design gives you:

- Provides new operator comfort and efficiency
- Cushions the chisel in the cut
- Absorbs chisel vibration
- Substantially reduces noise
- Eliminates maintenance due to improper operation

These new Shock-Absorber Chipping Hammers are made in 5 sizes—each with four easily converted power ranges. This means you have 20 power combinations to meet exactly the cutting need of any type of job.

Call your nearby Ingersoll-Rand AIRengineer. He will be glad to show you this revolutionary new tool, and let you test it in your own shop, on your own work. Both you and your men will prefer it. Ingersoll-Rand, 11 Broadway, New York 4, N.Y.

8-750

Ingersoll-Rand

Tools plus AIRengineering increase output per man

component plant at Denver, to form a new Sundstrand-Turbo Div., managed by R. H. Olson. Willard Sweetman is operations manager at Pacoima. Both facilities will be operated at their present sites.

ASSOCIATIONS

Cutting Tool Manufacturers Association, Detroit, elected these officers: President, L. H. Skoglund Jr., Scully-Jones & Co., Chicago; vice president, R. H. Murdock, Murdock Tool Co., Detroit; and treasurer, G. R. Smith, National Broach & Machine Co., Detroit.

Plumbing Brass Institute, Pittsburgh, elected these officers: President, J. D. Clemens, Hays Mfg. Co., Erie, Pa.; first vice president, J. H. Pimm, Bridgeport Brass Co., Bridgeport, Conn.; second vice president, Roger Milroy, Lee Bros. Foundry Co., Anniston, Ala.; and treasurer, G. C. Harper, Burlington Brass Works, Burlington, Wis. Hanson & Shea Inc., Pittsburgh, acts as secretary of the group.

Canadian Steel Warehouse Association has been organized in Toronto, Ont., by a group of executives engaged in the steel warehousing business.

Dr. D. W. Levinson has been advanced to assistant manager of the Metals Research Dept., **Armour Research Foundation** of Illinois Institute of Technology, Chicago.

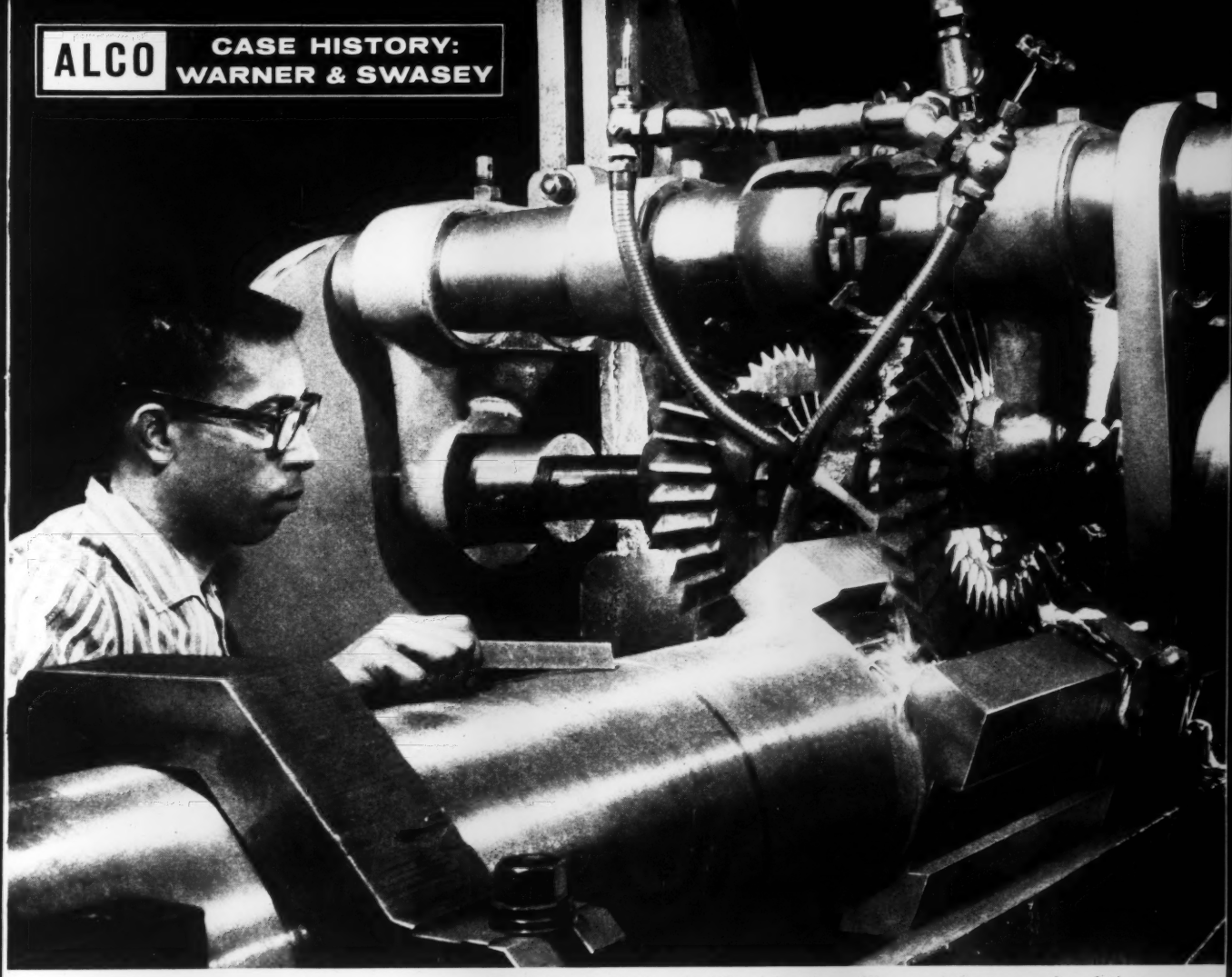
CONSOLIDATIONS

Union Spring & Mfg. Co., New Kensington, Pa., acquired **Biggs Boiler Works Co.,** Akron, a steel fabricator. The property will be operated as a subsidiary, Biggs Steel Foundry & Fabricating Co.

Stackpole Carbon Co. will merge with **Pure Carbon Co. Inc.** Both are in St. Marys, Pa. Pure Carbon will become a subsidiary of Stackpole.

Lodge & Shipley Co. acquired **Climax Products Corp.,** manufacturer of automatic bottle handling

ALCO CASE HISTORY: WARNER & SWASEY



With ALCO's *Hi-Qua-Led Steel forgings, Warner & Swasey reduced time for straddle-mill dovetailing of tool holder's pentagon shape by 71%.*

MACHINE TIME CUT 33%, TOOL LIFE TRIPLED WITH ALCO'S HI-QUA-LED® STEEL FORGINGS

With open-die forgings of ALCO's special free-machining Hi-Qua-Led Steel, Warner & Swasey has reduced machining time 33% on a pentagon-bar tool holder for their automatic chucking machine. Time for the various milling operations has been reduced as much as 71%, and turning time 33%.

Warner & Swasey has found that in every operation the use of Hi-Qua-Led forgings has meant savings in tool life, machining time or both. In the trepanning operation, run at the same speed as before, the life of expensive tools has increased up to three times.

ALCO's Hi-Qua-Led Steel forgings have unique advantages of machinability, while maintaining the physical characteristics of regular forgings of the same grade. Cost is just a few cents more. Circular shapes, forged and rolled, range from 18 to 145 in. OD; open-die shapes from 1000 to 30,000 lbs and up to 40 ft long; mandrelled ring forgings up to 60 in. wide.

Contact your nearest ALCO sales office for full information on the many advantages of Hi-Qua-Led Steel forgings, or write ALCO Products, Department 154, Schenectady, New York.

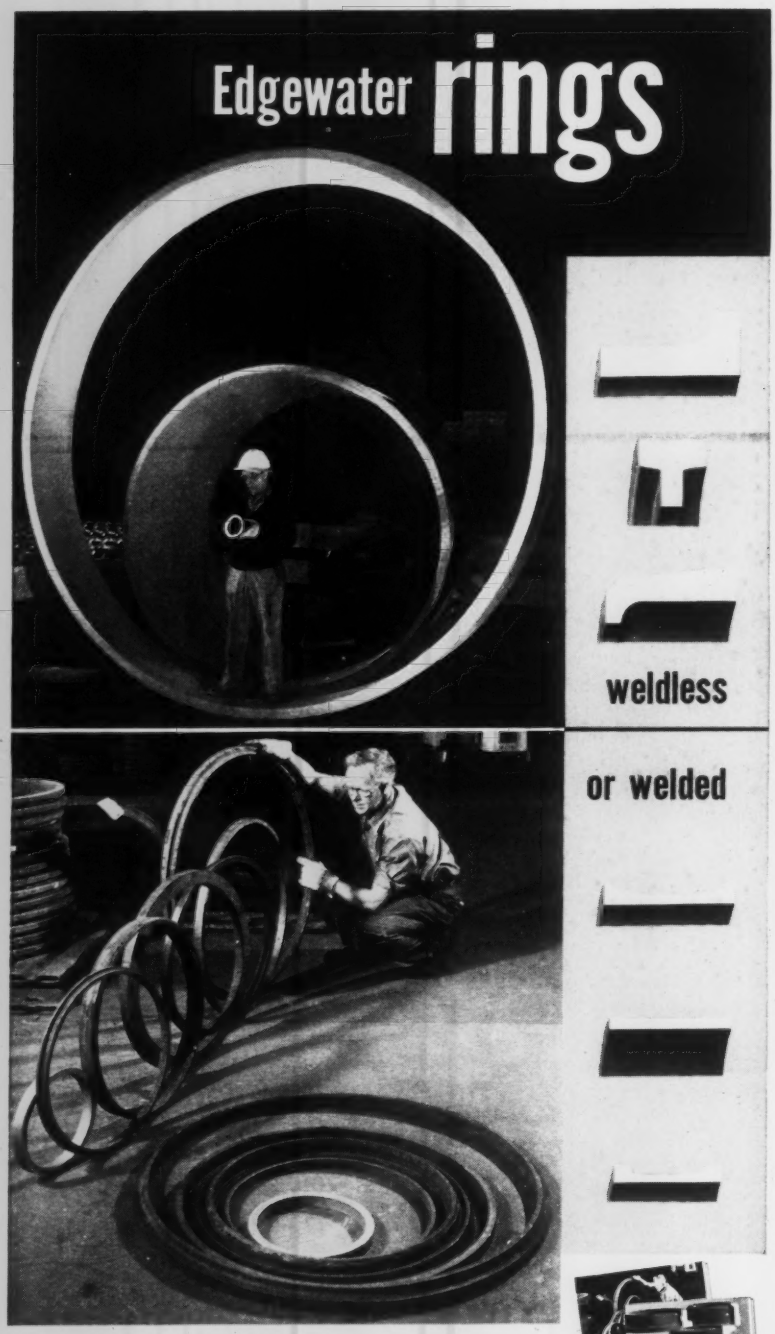
ALCO

ALCO PRODUCTS, INC.

NEW YORK

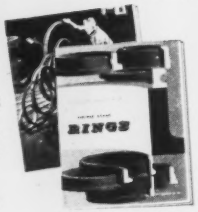
SALES OFFICES IN PRINCIPAL CITIES

LOCOMOTIVES • DIESEL ENGINES • NUCLEAR REACTORS • SPRINGS • STEEL PIPE • FORGINGS • OIL FIELD EQUIPMENT



Uniform, dependable, accurately made Edgewater Rings are furnished in a wide variety of cross-section shapes, and in diameters from 5 to 145 inches. They meet the most critical specifications and standards of quality.

Representative applications include bearing races, jet engine parts, parts for missiles and rockets, gears, grinding rings.



Write for bulletins and complete data.

Edgewater Steel Company

P. O. Box 478 • PITTSBURGH 30, PENNA.

equipment. Both are in Cincinnati. C. J. McHugh will be chief operating officer of the Climax Products Div.

Clark Equipment Co., Buchanan, Mich., will acquire **Brown Trailers Inc.**, Spokane, Wash., manufacturer of aluminum trailers and cargo van bodies.

NEW PLANTS

Ducommun Metals & Supply Co., Los Angeles, opened a new warehouse and office facilities at 301 S. 26th St., Phoenix, Ariz. Manager of the Arizona Div. is Royal N. Thayer. Metals and industrial supplies and equipment will be stocked.

The new plant address of **McGregor-Michigan Corp.** (shipping and receiving only) is 13360 Helen Ave., Detroit, Mich. The firm's offices remain for the present at 5818 Rivard St., Detroit 11, Mich.

Girdler Construction Div., National Cylinder Gas Co., Chicago, has been awarded a $3.4-million contract to design and build hydrogen, nitrogen, and carbon dioxide producing and purifying units for a high-energy fuel plant at Muskogee, Okla. Callery Chemical Co., Pittsburgh, is the prime contractor for the Navy's $38-million plant.

Trane Co., La Crosse, Wis., has placed in operation a $1.2-million plant to produce heat exchangers. The 76,800 sq ft facility represents one of the final phases of a $13-million expansion program.

Edgcomb Steel Co., Philadelphia, is building a warehouse and office in Greensboro, N. C. Investment in plant and inventory will total $1.5 million. The 50,000 sq ft warehouse will stock steel and aluminum products. W. J. Winter will manage the Greensboro operation.

Westinghouse Electric Corp., Pittsburgh, will build a manufacturing and repair plant at New York Mills, N. Y., to replace one in Utica, N. Y. Cores and coils used for the repair of distribution transformers will be made at the new facility.

ANOTHER INDUCTO INSTALLATION...

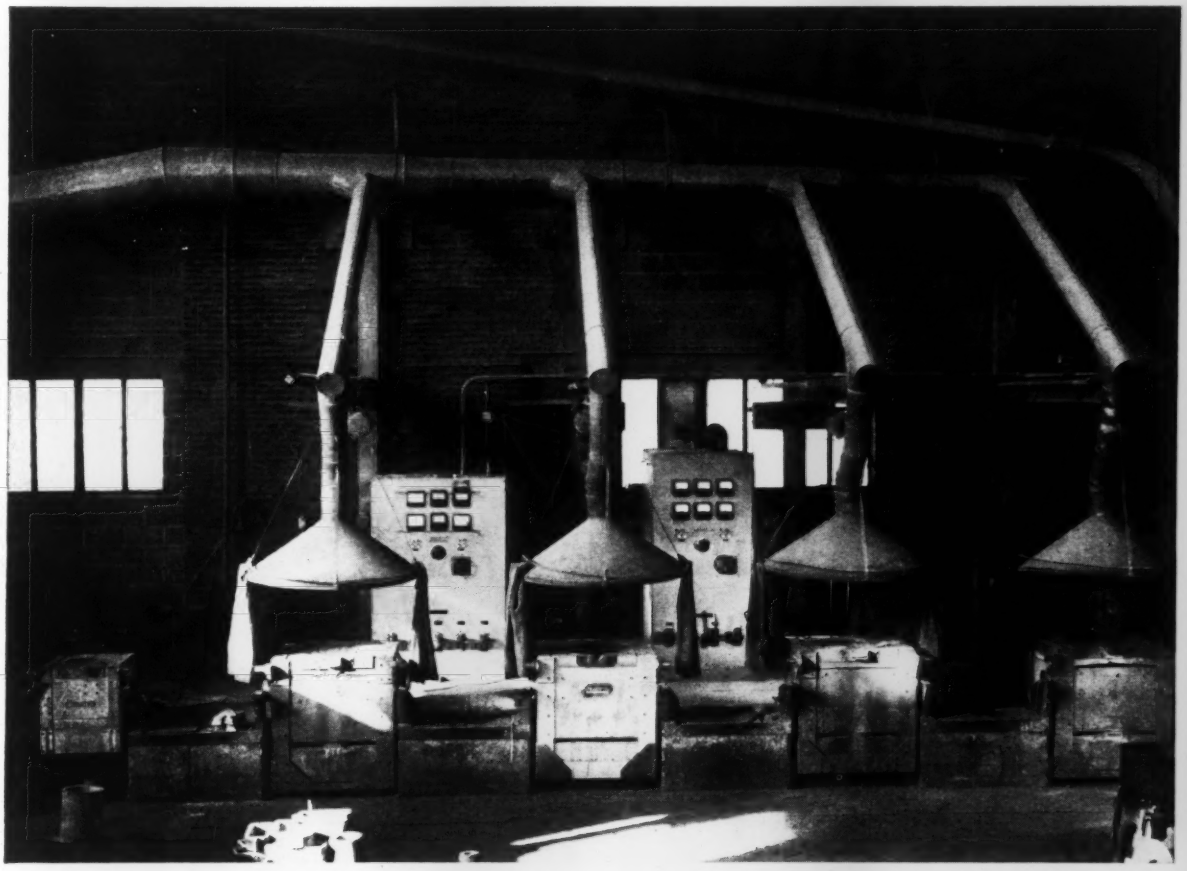


PHOTO COURTESY OF SORENSEN INDUSTRIES.

In Two Years Of Operation At Sorensen Industries, These INDUCTO Furnaces Saved More Than Their Cost

Since Sorensen Industries installed INDUCTO induction furnaces, they have reduced metal losses and minimized rejects. These benefits plus higher melting speeds have saved more than the cost of the furnaces in just two years of operation.

The installation includes four, 1000-pound furnaces which are operated from a 250 kw m-g set. A 50 kw m-g set is interlocked with the main unit so that it can maintain a molten bath in any of the four furnaces at holding temperatures. Four furnaces were used in this installation to eliminate contamination from one alloy to another.

You, too, can benefit from modern INDUCTO metal melting equipment. Want to know more? Write today. INDUCTO engineers will be glad to study your requirements. The Inductotherm Corporation, 412 Illinois Avenue, Delanco, New Jersey.

INDUCTOTHERM corporation

412 Illinois Ave. Delanco, N. J.

Vapor degreasing with Columbia-Southern Trichlor readies big birds for accurate flights

Another "big bird" blasts free from its pad, curving within seconds into a successful flight pattern.

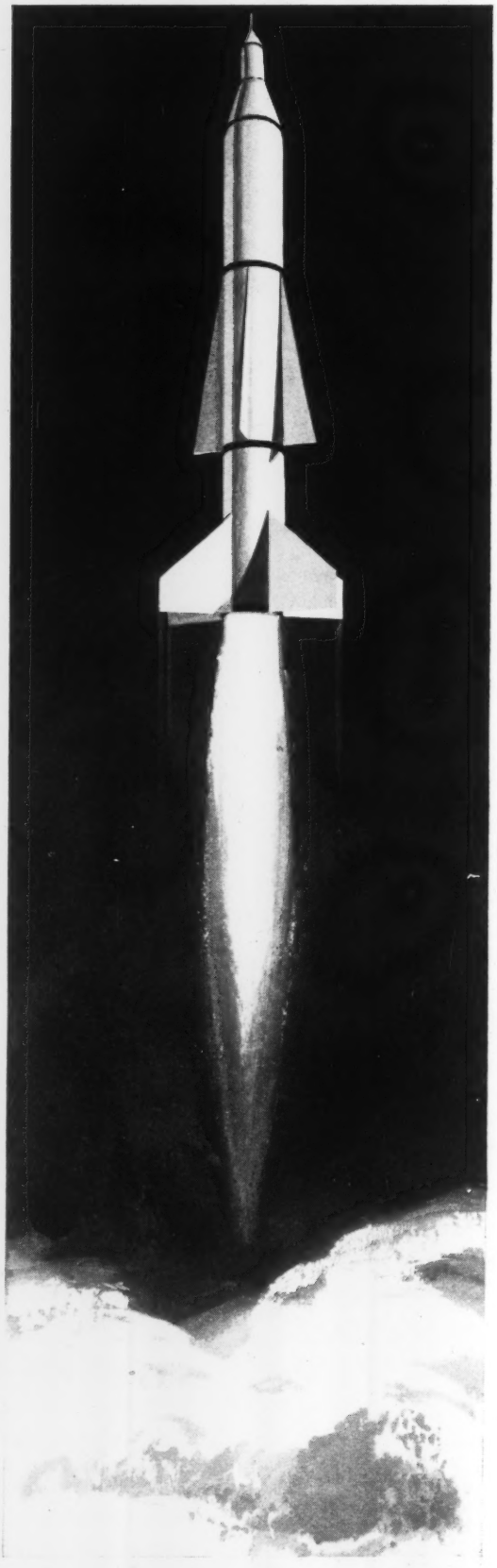
These fantastically complex missiles and rockets need . . . and get . . . the very finest quality control at every step of component manufacture and final assembly. Delicate controls, fuel systems, instrumented packages can be thrown fatally awry by contamination. We think it's significant that suppliers' and prime contractors' flow plans so frequently specify vapor degreasing with Columbia-Southern Trichlorethylene.

Much of the preference is due to this solvent's exclusively developed *special stabilizer*. Chemically different from the highly alkaline amines used in many other trichlorethylene formulations, Columbia-Southern's stabilizer cuts rejects . . . units run longer without cleanout and pH stays high far beyond operating norms.

Columbia-Southern Trichlor is delivering these uniformly fine results with aluminum, magnesium, titanium, steel and special alloys. It sends parts out of units clean and dry, *completely* bare of chips, grinding or buffing compounds, graphite, grease, coolants, quenching or lubricating oils. Even the deepest draws are cleaned as thoroughly as surfaces. Order a drum or tank car *today* from the nearest Columbia-Southern District Sales Office or from your regular solvents distributor. Your work and *costs* will show a difference you'll like. The Columbia-Southern Chemical Corporation, One Gateway Center, Pittsburgh 22, Pennsylvania. Offices in principal cities. In Canada: Standard Chemical Limited.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

A Subsidiary of Pittsburgh Plate Glass Company



STEEL
March 3, 1958

Technical Outlook

RESEARCH BY COMPUTER— A petrochemical pilot plant controlled by an electronic computer is being built by Consolidated Electrodynamics Corp., Pasadena, Calif., for Esso Research & Engineering Co., Linden, N. J. Predicted benefits include tremendous savings in time and the ability to analyze chemical changes in a tenth of a drop of liquid. The venture has enormous implications for metalworking processes that are essentially chemical: Plating, smelting, metal refining, waste control, atmosphere heat treating, and coke chemical recovery.

RUST CONTROVERSY— The Steel Structures Painting Council, Pittsburgh, is doing tests in the hope of settling an argument: Whether rust pigments prevent or stimulate rust. Rust instead of other oxides has been proposed as an ideal pigment for cheap rust preventive paints.

ULTRASONIC TEST IDEA— Avco. Mfg. Corp. has developed an immersion tank for ultrasonic testing that uses a 7 ft rotating table (made of stainless) to permit scanning at 12 to 100 in. a minute—with modifications, it's expected to hit 200 ipm. The unit will be used to inspect parts for the Air Force's Titan intercontinental ballistic missile.

HOW TIGHT?— How much should a bolt be torqued to make it tight enough but not too tight? A way to take out the guesswork is proposed by Skidmore-Wilhelm Mfg. Co., Cleveland. It's based on the proposition that it takes about 90 per cent of torque to overcome friction of the bolt head and threads, so that only 10 per cent of applied torque creates permanent tension in the bolt.

FREE FLOW BIN— Bituminous Coal Research Inc., Pittsburgh, has been looking into the problem of bulk storage bins. The best design evolved so far is a cylindrical bin with a conical bottom and a central plug shaped like two cones base to base. The plug directs flow down the sides. There is no bridging or sticking, even when the material is wet and loaded with fines. Key dimensions (included angles): Bin bottom cone, 30 degrees; plug bottom cone, 21 degrees; plug top cone, 26 degrees.

BREAKTHROUGH FOR TESTER— Lehigh University's 5 million lb universal testing machine has had its severest test. It fractured a high-strength steel beam that was 26 ft long, 50 sq in. in cross section, and weighed 6500 lb. The tensile specimen snapped at 4,750,000 lb.

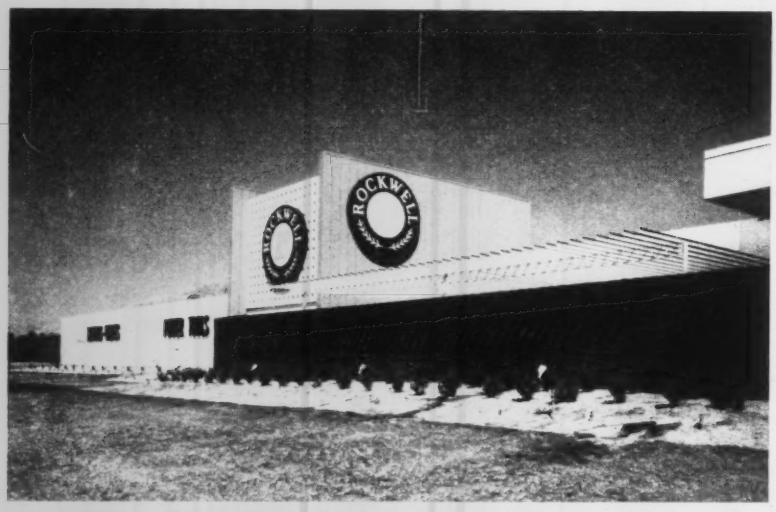
BETTER COKE— A coal preparation process for improvement of coke gets its effectiveness from optimum sizing of each coal in the coke blend. The Burstlein process, introduced in England, employs sizing methods that reduce the volume of fines normally produced.

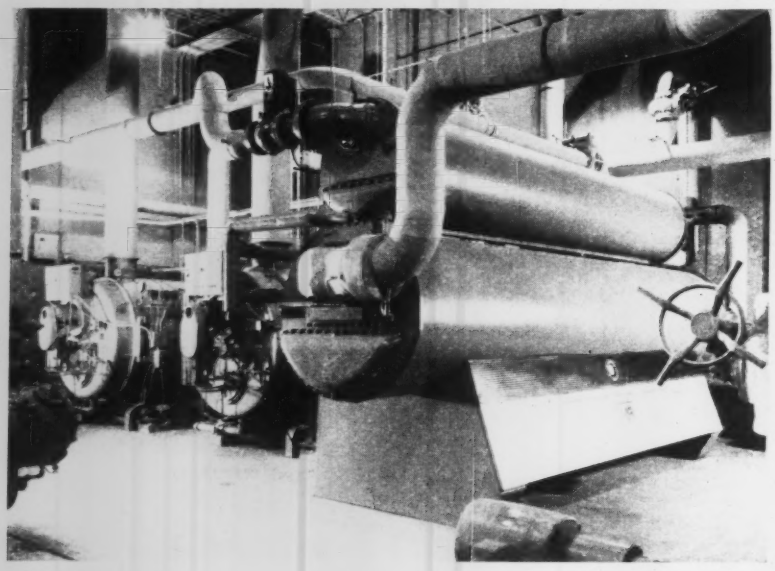
ULTRASOUNDNESS STEPS AHEAD— Automatic, high speed ultrasonic testing of plates, rods, and extrusions isn't far off, says the Air Force Materiel Command. The discovery that turned the trick: An automatic distance correction circuit, developed by Sperry Products Inc., Danbury, Conn., under an Air Force contract.

HEAT-TRIGGERED SHEAR— Bars on the new cooling beds of Colorado Fuel & Iron Corp.'s continuous rod mill in Pueblo, Colo., are cut to length by a shear actuated by radiation from the hot metal.

NEW WAY TO WELD ALUMINUM— The method features an improved way to surround the weld area with combinations of shielding gases. A low flow of argon, or argon and a trace of chlorine, is introduced through the electrical contact tube in the welding head. The outer shield can be argon, nitrogen, or helium. The process was described by F. R. Baysinger, head of welding research, Kaiser Aluminum & Chemical Corp., Oakland, Calif., at the 4th Midwest Welding Conference, Armour Research Foundation, Chicago.

Metalworking Outlook—Page 47 Market Outlook—Page 141





Two gas-fired boilers furnish the heat to run the gas absorption air conditioning system which cools this Texas factory. Temperature is held at 76° F; relative humidity is 50 per cent

Gas Heat Cools This Plant

Air conditioning pays for itself by improving worker efficiency. This firm also noted an upturn in the quality of production. Stored metal parts no longer collect moisture and rust

IF you're going to air condition, don't overlook the gas absorption method, advises H. Campbell Stuckeman, vice president, Rockwell Mfg. Co., Pittsburgh.

Both first and operating costs are comparable to those of compressor driven plants. The system has practically no moving parts. It's simple to operate—a secretary can adjust it.

Comparison — Rockwell recently installed both compressor and absorption systems in its plants. It first tried a compressor driven by steam from a gas-fired boiler at its plant in Sulphur Springs, Tex. The hourly operating cost is 1.13 cents per ton of cooling capacity.

Its Kearney, Nebr., plant is similar in size and function, but it's cooled by absorption systems. They use steam or hot water from gas-fired boilers. With gas at 26 cents per 1000 cu ft, the hourly operating cost is 1.11 cents per ton. (Figures do not include depreciation or interest expense.)

Rockwell's records also show that electrically driven compressor machines would have cost more to install than absorption systems. Equipment cost per ton was lower, but starters and large motor wiring more than made up the difference.

How It Works—An absorption machine cools by spraying water into a vacuum. When the water evaporates, it absorbs heat. To maintain the vacuum, a salt solution in the bottom of the vacuum chamber absorbs the water vapor. As the brine is gradually diluted, it is pumped into another chamber and boiled. That concentrates the salt, and when it reaches normal strength, it is returned to the vacuum chamber for re-use.

Overloads can't damage the equipment. It simply operates at maximum capacity without the internal overheating common to other types of equipment.

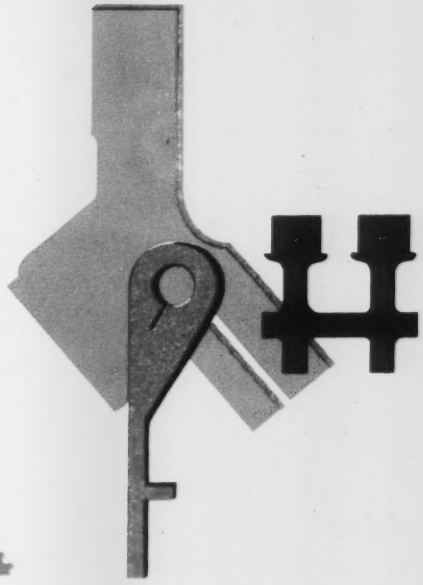
Any kind of fuel will operate the devices. In addition to steam, they can be heated by hot water, oil, chemicals, or byproduct wastes. Low pressure steam being exhausted to atmosphere is an ideal source.

Installations — Absorption units are light enough for roof installations. Rockwell combined a roof mounting with windowless construction and gained nearly 10 per cent more usable floor space.

One unit is on the top of the 56-story Chanin Bldg, New York. (It was hoisted up the outside of the building.)

One of the larger manufacturers, Carrier Corp., Syracuse, N. Y., installed nine of the 705-ton units at Idlewild's Terminal City in the New York metropolitan area. Installed in a glass-fronted building, they are a point of interest in conducted tours of the airport. Chilled water is piped out to air condition ten buildings around a 655-acre oval.

If you're having trouble
With intricate parts
Or low physical properties,
This industry may be able to help you



production ideas
NO. 18 OF A SERIES

Investment Castings Go Civilian

MANUFACTURERS with production problems brought about by intricate and hard-to-fabricate parts can now look for help from investment castings. Cutbacks in aircraft programs have made them available for nondefense uses.

Companies taking advantage of this new source of parts report cost savings up to 150 per cent, significant reductions in labor costs per piece, and as much as a twelvefold increase in part life.

Most investment casters will tell you that producers of commercial products have barely tapped the potential of their process. One big deterrent is the notion it's so expensive that only Uncle Sam can afford it.

Clarification—It's true that investment castings are expensive. They cannot compete with many simple mass-production items, but industry officials are quick to point out that the process offers many offsetting advantages, such as design freedom and a reduction in secondary operations. (See exhibit, Page 96, for complete list.) Where one or more of the benefits can be realized, design engineers should investigate the process, declares William H. Shuman, sales manager, Hitchiner Mfg. Co. Inc., Milford, N. H.

Investment casting also has practical limitations. Some years ago, for example, its precision was oversold, which led to overspecification of tolerances and resultant failure of parts.

No claim is made that tolerances compete with those you can get with machining, but the industry does insist that theirs is the most precise casting method available. Tolerances can be held to $\pm$ 0.005 in., with $\pm$ 0.003 in. under certain conditions. A part often can be used as-cast.

First Things First—Peter Schipper, general manager of the Investment Casting Div. of Howard Foundry Co., Milwaukee, believes that quality, not close tolerances, is the big selling point. "It wasn't precision work that gave this industry its big boost. The Air Force wanted the qualities found in alloys that couldn't be fabricated in any other way."

One of the big advantages of the process is the wide choice of alloys it offers. The *Engineering & Design Manual* published by the Investment Casting Institute lists eight common types of alloys, but Precision Metalsmiths Inc., Cleveland, claims it has cast about 160. It lists more than 100 as being available commercially.

Case Study No. 1—Victor Chemical Co., Chicago Heights, Ill., is taking advantage of the flexibility such a wide choice permits. The company was having trouble with an extruding die plate 4 in. in diameter. The $\frac{5}{8}$-in. thick plate was

Why Investment Castings Are Used

1. **Freedom of Design**
   Practically any shape can be made.
2. **Wide Choice of Alloys**
   Any metal that can be melted is available.
3. **Reduction of Secondary Operations**
   Close tolerances, superior finish, and elimination of draft reduce scrap loss and free machinery for other uses.
4. **Weight Reduction**
   Undercutting, coring, and thin sections make parts lighter.
5. **Good Density and Uniform Structure**
   They are pressuretight and of uniform quality.
6. **Flexibility of Production**
   It's feasible for a few parts or thousands.
7. **Elimination of Assemblage**
   One casting can replace a multiple part assembly.
8. **Reduction of Inventory and Warehouse Costs**
   Only one part, instead of several, is stocked.
9. **Reduction of Purchasing Costs**
   Sources can be reduced to one.
10. **Thinner Sections**
    Use of hot molds permits lower pouring temperatures, making thinner walls possible.

perforated by 102 holes, which measured 13/64 in. on the entry side and 9/64 in. on the discharge side, leaving a collar half way through. The part was produced from tool steel bar stock, requiring over 200 separate operations.

Electronicast Div. of Nilsen Mfg. Co., Addison, Ill., redesigned it as an investment casting, using 440-H17 stainless steel. The holes are tapered, and the part is used as-cast. Mark Anable, mechanical superintendent at Victor, reports a saving of 50 per cent on each part. At the rate of 60 pieces a month, the tooling will be amortized in three or four months.

"The life of the new part is not particularly longer than that of the old, but it is comparatively inexpensive to cast several alloys until the right one is found," Mr. Anable says.

But a problem does not have to be complicated to profit from the process. "We have cast quite simple parts when the alloy has justified it, or when the quantity has been too small to warrant the initial cost of tooling up for other methods of fabrication," say officials of Arwood Precision Casting Corp., New York.

Case Study No. 2—Electronicast is making a spring retainer for Miehle-Goss-Dexter Inc., Chicago. It looks like a simple slug about 2 in. long, 1 in. wide, and about 3/8 in. thick. It is slightly rounded on one side, flat on the other, with circular indentations on each end of the flat side where the springs ride. M-G-D estimates its cost per part is 25 cents less than what it was with its previous method of fabrication. Volume is about 15,000 pieces a year.

M-G-D is also using an investment casting for a retractable "tension lockup finger" on its rotary printing presses. Because it's small, its cost would be almost prohibitive if it were made by any other method, company officials report.

Case Study No. 3—Casting Engineers Inc., Chicago, a division of Consolidated Foundries & Mfg. Corp., is making a lock cam used in a mechanism to clamp wire on a portable telephone switchboard. It is cast in a cobalt-chrome Stellite alloy to provide superior wear properties. The fluidity of this alloy enables the company to hold an average maximum radius of 0.003 in. on the clamp's teeth. Tolerances are held closer than usual for investment castings—Casting Engineers claims ± 0.001 in., with no greater tolerance than ± 0.003 in. Almost 3 million have been produced at less than 8 cents a piece.

Case Study No. 4—These castings also may be used with other methods of metal fabricating. Haynes Stellite Co., a division of Union Carbide Corp., New York, is casting a standard, nearly finished blank for wing friction blocks which American Can Co. will use in machinery that makes can bodies. A face radius is machined to one of 17 dimensions that will correspond to the size of the can in production. Prior to investment casting, it took 4 to 5 hours to machine the part. Now it takes only 2 hours.

Case Study No. 5—Globe-Union Inc., Milwaukee, had a metallurgical problem with a part for a spark-plug. The bar stock used did not have the needed strength, hardness, or abrasion resistance. Also, the part was expensive because it required 12 separate operations. Howard Foundries is now casting this part in Hasteloy C alloy. It has the required physicals, plus an added advantage. Globe-Union reports: "The part included a ring groove for a special C-ring. Of the more than 2000 pieces cast, it was unnecessary to clean any of the grooves. Only a simple hand file correction on a few pieces was needed." Savings: 20 per cent in over-all cost, including die charges.

Most of these parts are comparatively small, and all those mentioned so far are made by the lost wax method described on Page 98. (It is so called because the wax or plastic pattern is melted out of the investment, leaving an exact pattern for the metal part.) Size has been one of the major limitations of the process. An ICI survey last year revealed that 77.8 per cent

of the castings weigh less than 1 lb, although pieces weighing 25 lb or more are common.

When parts become too big to use a wax or plastic pattern, it might be a good idea to check with the other segment of this industry, the frozen mercury investment casters. They have cast parts weighing up to about 350 lb. Even though the process is expensive, it often is the only way the customer can get the physicals or tolerances he needs.

Generally speaking, it is possible to hold closer tolerances with this method than with wax or plastic molds.

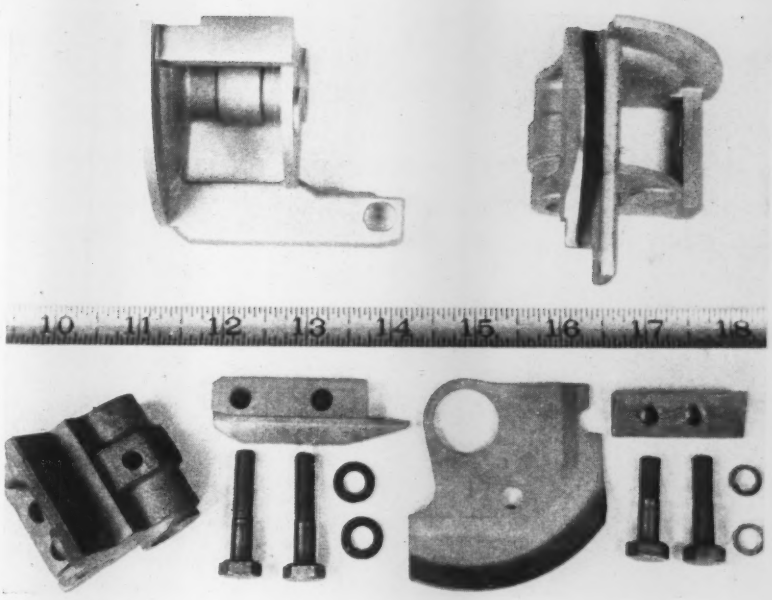
Case Study No. 6—Design engineers at the Cleveland Rock Drill plant of the LeRoi Div. of Westinghouse Air Brake Co., Cleveland, were having trouble with a steel plate which acted as a stop for a reciprocating rock drill holder. Under punishment of continual hammering, the plate distorted and malfunctioned. The part was redesigned as an integral, nondistorting part of the tool's body, including the ways along which the toolholder travels.

Three methods of manufacture were considered, and Alloy Precision Castings Co., Cleveland, a division of Mercast Corp., got the job as a frozen mercury casting. LeRoi officials say these were the deciding factors: 1. Excellent surface quality. 2. Structural strength. 3. The part can be used as-cast, eliminating secondary operations.

Something New—The investment casting industry is coming up with developments that may help solve your problems. Casting Engineers is about to introduce a technique using an investment cast blank, "which we further work by . . . coining, cold heading, or other machining processes to produce a lower cost part with greatly superior physical and dimensional characteristics," says President Vincent S. Lazzara. "We can obtain average dimensions of ± 0.003 in. per inch, with ± 0.001 in. per inch as the best tolerance," he continues. It will be particularly advantageous when applied to large quantities of parts which are 1 cu in. or less in size.

Hitchiner Company is working on a process using shell molds for wax or plastic patterns similar to those for the frozen mercury process. Larger castings will be made available through this process.

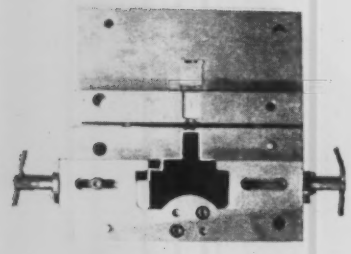
Arwood has come up with a method which makes it possible to guarantee the tensile strength, yield strength, and elongation of any aluminum casting. The properties are said to be superior to qual-



This shuttle lifter, used on a Warner & Swasey weaving machine, was formerly a 12-part assembly. It was redesigned by Precision Metalsmiths Inc. as a one-piece investment casting at a cost saving of 86 per cent. Weight: 10 ounces

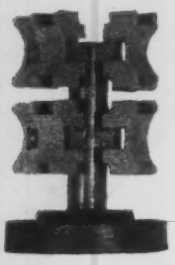
Here are three commercial applications of investment castings made by Kolcast Industries, a division of Thompson Products. At left is a 50-lb pump impeller for a high flow water pump. In the foreground is a valve body for a hydraulic system. The 8-lb milking machine filter at right is cast in 304 stainless steel

Investment Casting:
HOW IT IS DONE



. . . STEEL OR ALUMINUM DIE

MAKES WAX OR PLASTIC PATTERNS . . .

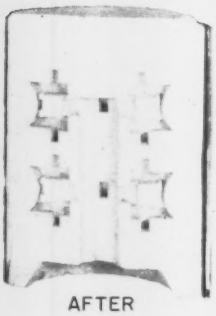


. . . WHICH ARE CLUSTERED ON TREES

INVESTED IN FLASK . . .

PATTERN IS MELTED OUT . . .

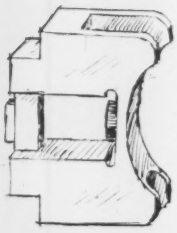
BEFORE



AFTER

METAL IS POURED IN . . .

PRODUCING FINISHED PART



Photographs by Precision Metalsmiths Inc.

ity specified for aircraft.

In addition, several investment casters are working with vacuum melted metals and vacuum casting for extremely high purity and physical properties. Most applications will be for defense, but it is conceivable that some commercial customers might be willing to pay the price.

Most investment casting people feel that there is a large untapped market for their products clear across the board in metalworking.

Outlook—"Sales . . . to nondefense industries should reach an all-time high of more than $19 million in 1958," declares Mr. Lazzara. "Ten years from now," he predicts, "ours will be one of the major methods of metal fabricating."

R. E. Gray, vice president of Gray Syracuse Inc., Manlius, N. Y., says: "We believe that investment applications in the electronics field are most prominent today. However, we feel that all industries have parts that could be ferreted out and produced more economically as investment castings."

Such optimism is based partly on the rapid strides the industry is making to overcome some of its technological and production barriers. "Things we couldn't do six months ago we can do today," claims Robert Miller, president of Precision Metalsmiths Inc., Cleveland, and head of the Investment Casting Institute.

Where They're Used—Some of the most promising industries are food processing machinery, valves and pumps, special machinery, testing instruments, electrical controls, small arms, and medical and dental equipment. One company president says he is making at least one part for each of 16 nondefense industries.

While most investment casters think of their process in terms of high volume, there are many shops set up to do special short run jobs economically. Only a few of the 40 members of ICI are considered big business in this field. And most of the other 50 or 60 companies not in the institute are small shops not capable of handling mass production.

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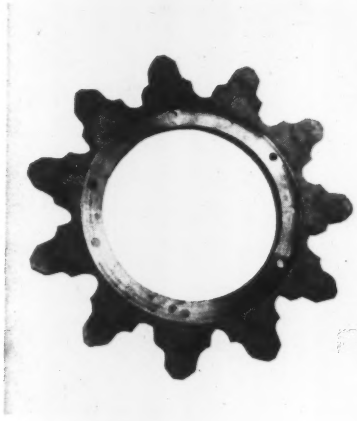
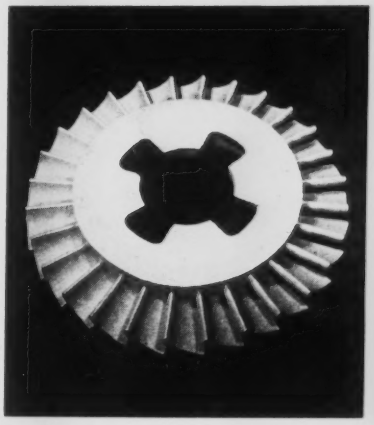


1 **SPROCKET . . .** saves metal

2 **HOOK . . .** saves machining



3 **NOZZLE RING . . .** is easier to make

Cutting Costs: Three Blue Ribbon Ideas

Steel casting applications illustrate important areas of saving. They were among the entries in the Third Product Development Contest of the Steel Founders' Society of America

1 THIS PART is used on the track assembly of the M48 tank. It has to be tough to withstand stresses and shock loads. The gear teeth must be hard on the surface to resist the constant scuffing of the track guides.

An accurate semipermanent graphite mold is used. Cores are inserted to form the bolt holes.

The mold cavity and riser are filled by injecting 195 lb of molten steel under pressure.

After the casting solidifies, it is removed from the mold, cleaned, and normalized. Only a simple boring operation is needed to finish the hub, and the part is ready to be flame hardened.

Savings—The method has a yield of 48 per cent. Scrap weight is 101 lb.

The Detroit Tank Arsenal estimates the cost of the cast sprocket to be about $10, plus $5 for machining and flame hardening. The cost is one-fifth that of the part originally used.

2 THIS PART is a component in an external cargo sling for a helicopter. It must meet these requirements: 1. Minimum strength of 150,000 psi. 2. Corrosion resistance (the entire sling is exposed to the weather). 3. Minimum distortion to avoid unnecessary machining. 4. Specified surface areas must be free of irregularities (not more than 0.005 in. in any inch) to avoid unnecessary friction among components. 5. The material must be of aircraft quality.

Part Selection — Vertol Aircraft Corp., Morton, Pa., chose an investment casting because it provides close tolerances and smooth surfaces. Machining time is only 2 hours. (The trend in the aircraft industry is to reduce machining to a minimum.)

Material Selection — Howard Foundry Co., Milwaukee, casts this part from 17-4PH, a precipitation hardening stainless steel. The material was selected because it distorts little during the low temperature heat treatment, assures adequate strength without the need for violent quenching, and gives good resistance to corrosion without any additional protection.

Advantages—Only the shank and a few holes are machined. Put another way, only 3.5 per cent of the casting is machined away.

3 THIS PART is a nozzle ring for a locomotive supercharger. The Watervliet, N. Y., Works of Allegheny Ludlum Steel Corp. says it picked up several benefits by using a cast-weldment: Lower production costs, better appearance, longer service life, and improved dimensional accuracy. Another plus: A wider range of alloys can be used for the hub and blades. Some dissimilar alloys can be cast-welded but not arcwelded.

Process—Rolled blades (347 stainless) are welded to a 410 stainless steel hub by using the shell molding process.

Blades are positioned by a core ring in the shell mold halves which form the hub. Pouring at 3000 to 3100° F forms the hub and welds in the blades whose ends extend into the hub ½ in. A hole drilled through each blade near its weld

end adds a mechanical fastening.

Special Equipment—The corebox was made with allowances for diametral shrinkage and angular shrinkage of the blades. Five sections pull apart so that the cured core can be removed without damaging critical surfaces.

In Production—To make a core, the operator preheats the box to 500° F and applies lubricant by spraying it through the holes in the bottom. The hot corebox is clamped to the coreblower. After the core is blown, it is placed in the oven. While it is curing, the operator makes the cope and drag shell.

Rolled blades which have been sandblasted are pushed or tapped into the contoured slots in the core. This assembly is placed in the drag shell. Locating points align blades in proper relationship to the hub.

The blades are pushed against the outside ring of the drag which determines the outside diameter. The cope is set on top of the assembly and the complete unit is bolted together. The bolts act as clamps and locating pins for the cope and drag.

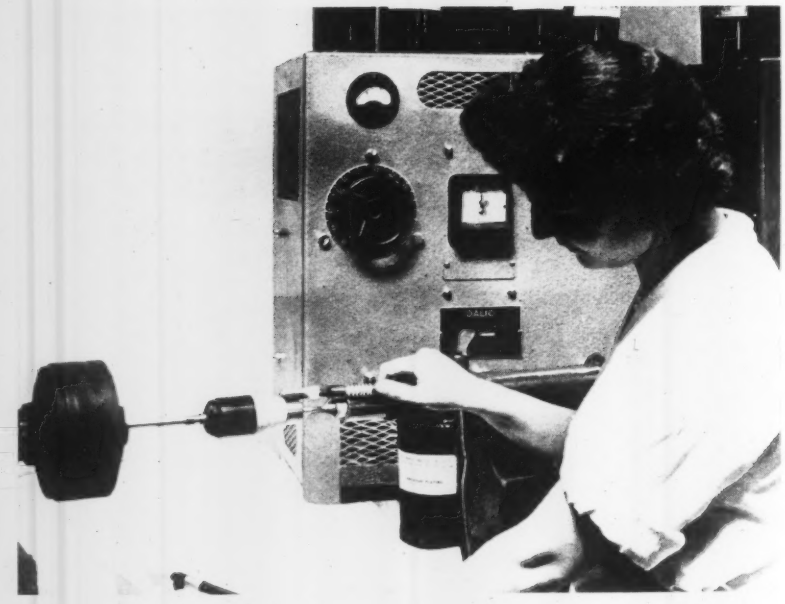
The mold is embedded in sand or shot and set aside for pouring off the hub.

Washer Cycles Rapidly

A high-speed machine for automatically washing and air drying parts has been developed by Gear-O-Mation Div., Michigan Tool Co., Detroit. Parts go through two hot washing stages and a drying stage. Cycle time at 100 per cent capacity is 15 seconds.

In one application, the washer was combined with a dual Roto-Flo machine (it cold forms gears, splines, and other toothed forms). The part, an auto transmission shaft, has two rolled splines. The formed shafts are fed by conveyor to the washer.

The bath and solvents are steam heated to 140-200° F to break down any oil adhering to the parts. After washing, the shafts pass through the drying unit where 22 high pressure air jets clean and dry them. A rinse station isn't needed. Production is 240 parts an hour.



Operator is holding anode stylus containing solution for rhodium plating motor commutator. Cathode connection is through lathe

Solves Motor Problem

IF YOUR electric motors aren't performing up to par and have a short life, check your commutator segments. Rapid formation of a copper oxide film on them could be the source of your trouble. If it is, try rhodium plating.

Dalic Metachemical Ltd., Toronto, Ont., has developed a method of rhodium plating commutator segments that is said to prolong motor life, eliminate radio interference, and reduce power consumption.

Documentation — In a test run, the firm treated a commutator in about 45 seconds at a cost of about 54 cents. The deposit was 0.00005 in., although half that amount would have been enough.

After 385 hours of continuous operation, the armature current under load was as much as 12 per cent less with the rhodium-plated commutator.

Temperature of the plated part was 464° F, vs. 572° F for the unplated one.

Wear, which used to be 0.030 in. after 168 hours, was not measurable after 600 hours.

Radio interference was eliminated for several thousand hours.

Method—Commutators are treated without immersing the entire armature in a corrosive plating solution. A special rectifier with a finely graduated voltage regulator permits close control of the plating current. It's the only major equipment needed.

The cathode lead is clamped to a small lathe in which the armature is rotated. The anode has a special plating stylus of pure graphite which is wrapped in cotton, and dipped in plating solution. The wet anode is swabbed over the area to be plated, and a highly cohesive, nonporous deposit of metal is obtained.

Thickness of metal depends on plating time and current which is indicated by the finely graduated ampere-hour meter.

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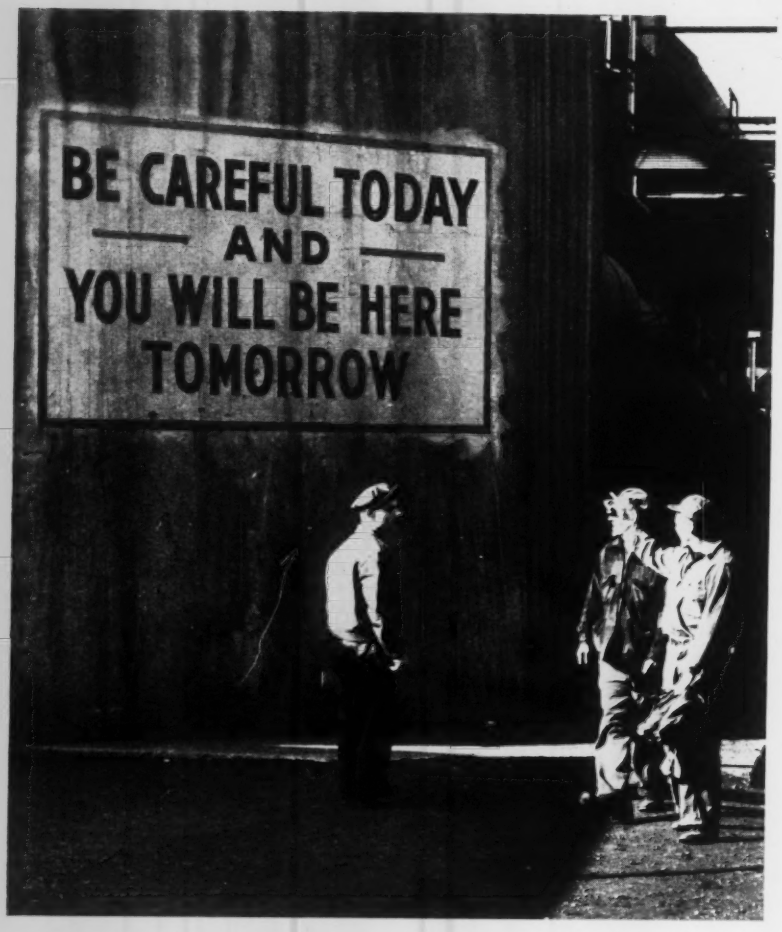


Safety Doesn't Cost— Accidents Do

On that premise, the subsidiary companies of Bethlehem Steel Corp. have built a safety program which breaks records in national competition year after year

LAST SUMMER, a Bethlehem Steel Co. executive came upon a scene that he viewed with mixed emotions. An employee was painting his own house. His ladder was equipped with nonslip safety devices.

The executive thought he knew the company shop from which the safety equipment was "borrowed." But despite the transgression, he was at least pleased to see that company safety practices were hard at work outside the gates.

For 15 years, Bethlehem plants have placed first in their class in national safety competition. The Bethlehem, Pa., plant has placed first nine times, Johnstown four, Lackawanna one. In 1957, Sparrows Point took the trophy. How does the company do it?

Attitude Is First—Production with safety—not production and safety—is the Bethlehem philosophy. By making safety a production tool, it becomes a means of increasing efficiency, so that production records and safety records go hand in hand. Or put another way, the operating efficiency per man goes up as the accident rate goes down.

If there is any one thing singularly outstanding in the Bethlehem program, it is the emphasis on the supervisor as the critical link in the safety chain. All the education for safety, the pamphlets, rule books, protective equipment, meetings, filter through him to the worker.

Safety Force—The program has to start with the president. "Wholehearted support" is not enough. The president has to insist that the safe way is the only way.

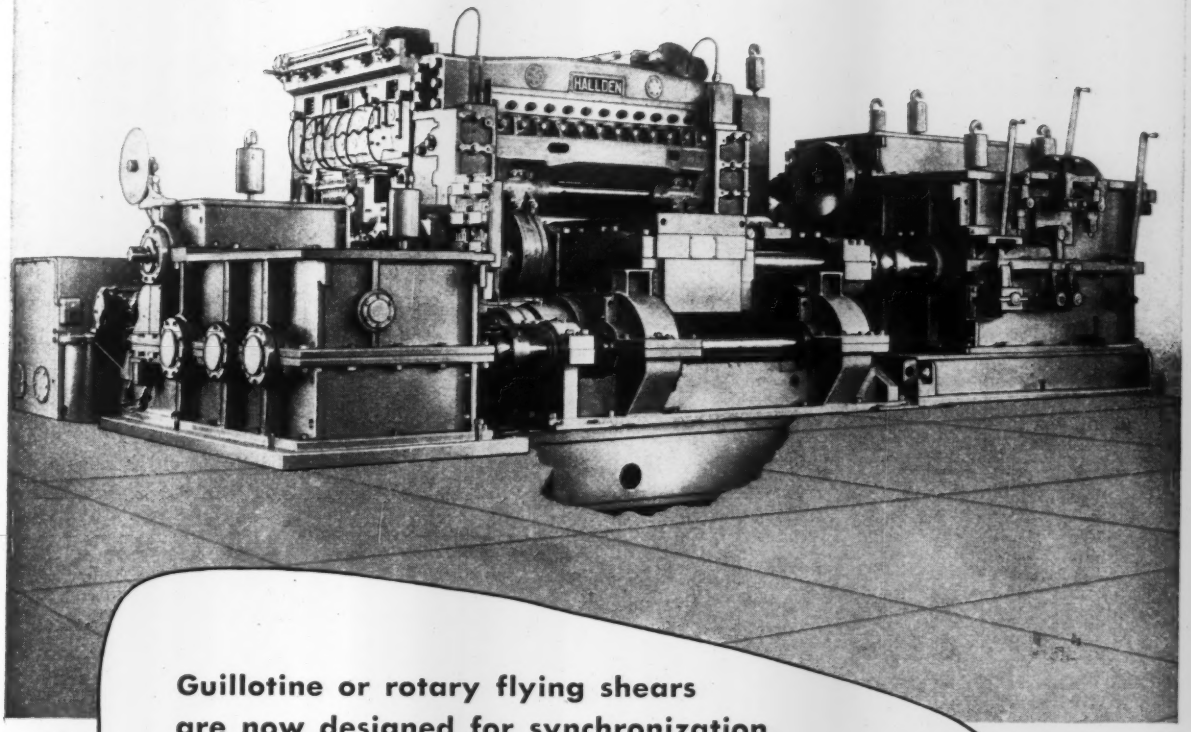
The program is conceived and administered by a staff that averages about one man per 1000 employees. But the number of people on the staff is not the measure of the safety program. For example, in 1951, one Bethlehem plant had an average monthly work force of 26,486, an accident frequency rate of 2.54, and a safety force of 20. In 1956, the safety force was the same, the work force was 24,629; but the accident rate had dropped to 0.78.

Job Safety Analysis—Looking for another answer, you come upon the job safety analysis (called JSA) as the most effective tool. It's widely used, but Bethlehem pioneered its adoption among steel companies. Here's how it works:

Each job is broken down step by step by the workman involved and his turn foreman. They list the hazards of each step and the precautions to be taken on a JSA form. The analysis becomes a guide to be followed to the letter. Over 29,000 initial and revised JSA's have been made at this plant alone.

Educating the Foremen—The value of JSA goes far beyond safety. It induces the foreman to learn the job of each of his workers, and the worker learns more about what he is doing. It reveals inefficient

SYNCHRONIZED "On the Fly"



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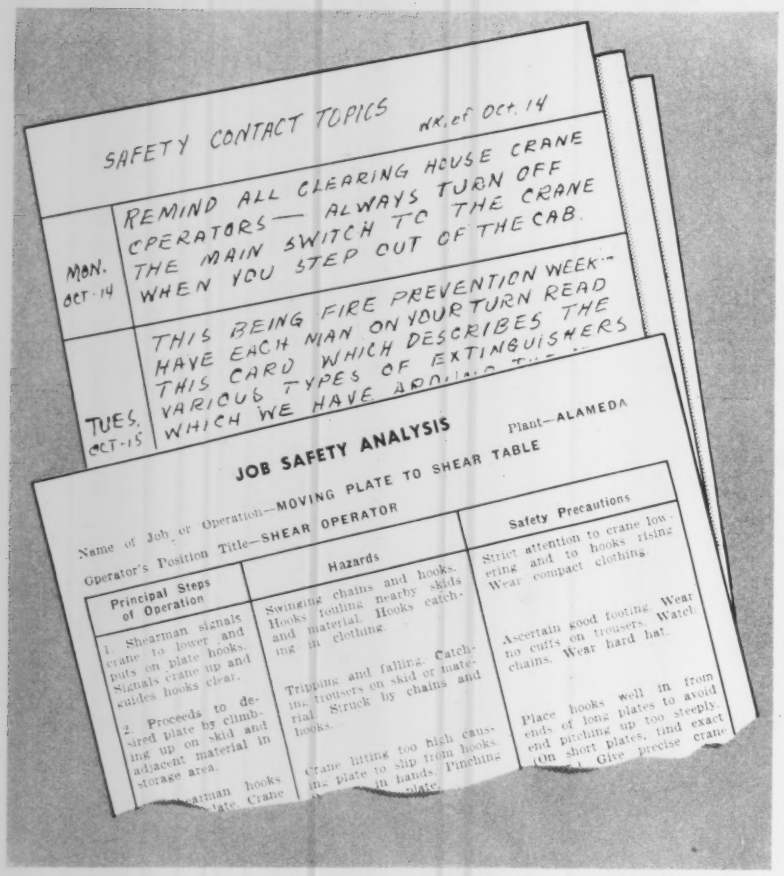


SAFETY CONTACT TOPICS wk. of Oct. 14

MON. OCT. 14 — REMIND ALL CLEARING HOUSE CRANE OPERATORS — ALWAYS TURN OFF THE MAIN SWITCH TO THE CRANE WHEN YOU STEP OUT OF THE CAB.

TUES. OCT. 15 — THIS BEING FIRE PREVENTION WEEK — HAVE EACH MAN ON YOUR TURN READ THIS CARD WHICH DESCRIBES THE VARIOUS TYPES OF EXTINGUISHERS WHICH WE HAVE ABOARD

JOB SAFETY ANALYSIS

Name of Job or Operation—MOVING PLATE TO SHEAR TABLE

Plant—ALAMEDA

Operator's Position Title—SHEAR OPERATOR

Principal Steps of Operation	Hazards	Safety Precautions
1. Shearman signals crane to lower and puts on plate hooks. Signals crane up and guides hooks clear.	Swinging chains and hooks. Hooks fouling nearby skids and material. Hooks catching in clothing.	Strict attention to crane lowering and to hooks rising. Wear compact clothing.
2. Proceeds to desired plate by climbing up on skid and adjacent material in storage area.	Tripping and falling. Catching trousers on skid or material. Struck by chains and hooks.	Ascertain good footing. Wear no cuffs on trousers. Watch chains. Wear hard hat.
Shearman hooks plate. Crane	Crane lifting too high causing plate to slip from hooks. in hands. Pinching	Place hooks well in from ends of long plates to avoid end pitching up too steeply. On short plates, find exact Give precise crane

TOOLS FOR SAFETY

Daily Reminders: Planning by supervisors assures that every man will be reached by the safety word

Job Safety Analysis: Worked out by foreman and worker, it teaches both the job and its hazards and often reveals changes that can lead to safer production

steps, and leads to suggestions for improvement. It shows up hidden hazards in equipment.

When any feature of the job changes—new equipment, new people, new procedures—a re-evaluation is called for. Even when a job remains static, a new JSA analysis is done at least once a year, just to be on the safe side.

Making out a JSA is equivalent to an accident investigation before the accident happens. If there is an accident when the JSA is followed, it's an indication that something was overlooked, and it's high time for a revision. And just so a foreman doesn't leave all his revisions for one week in the year, he is given a minimum bogey of one JSA review a week.

Person-to-Person—When a new man goes on a job, the safety supervisor talks to him, usually in company with his foreman, and explains the general hazards of the job. He is assigned to an experienced, safe worker for breaking in, and he goes over the JSA with his foreman.

At least once a day each foreman has informal talks on safety with his men, either individually or in small groups. They need not be longer than five minutes. The important thing is that they are held regularly, and foremen are required to report when they were given and who was talked to. This way every man gets a safety talk every couple of weeks. The close personal supervision builds a stronger bond between the men and their supervisor, which helps to reveal emotional distractions that could create hazards.

A foreman can choose his topics for discussion, but to jog his imagination, he's kept supplied with things to talk about. Each week he receives a vest pocket topic card which covers safety matters in the plant or outside.

Complementing the roles of the permanent safety force and the foremen are safety supervisors. They are one line of communication between the foremen and the central safety staff.

Rules—Like most modern companies, Bethlehem has its general safety code, and supplementary codes for individual shops and activities. They are printed as pocket-size pamphlets. Some 70 are in effect and every man is issued at least one. But the corporation has taken an additional step most companies haven't: It issues a set of general safety rules for contractors. They are enforced on all in-plant jobs done by outside labor.

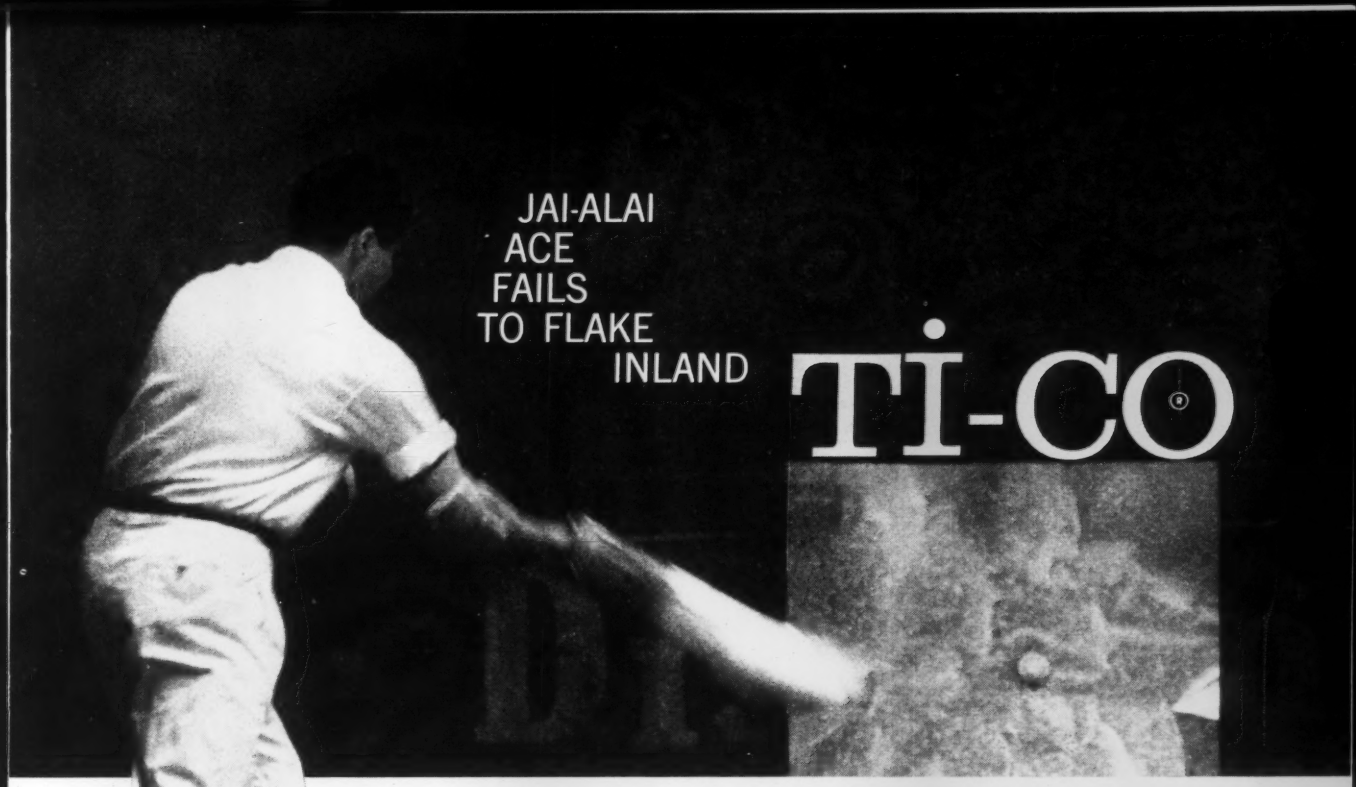
Before a contractor can begin work, his representative meets with plant safety personnel to go over the rules and discuss the hazards of the job. Here are some of the rules from the contractor's code:

"The contractor shall perform all contract work in a safe manner, and the company may stop or suspend work in the event the contractor does not comply with rules or instructions of the company with regard to safe practices.

"Contractors shall have full responsibility that their employees shall be equipped with proper protective equipment and shall comply with requirements for its use as established by the plant departments in which the work is being done."

Information — For a corporation as safety conscious as Bethlehem, you'll see surprisingly few safety signs and posters. Repeated personal contact is considered much more important than visual reminders. Handbills and pay envelope stuffers are never used to get out the safety word.

Subsidiary companies publish a monthly safety bulletin that is circulated to the foremen. It gets posted on the work area bulletin board—but only after the foreman has discussed its contents with his men. The safety bulletin is a four-page, slick paper pamphlet with lots



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A jai-alai ball travels at speeds over 100 m.p.h.—hits with terrific impact. From a distance of only 60 feet, one of Mexico's leading jai-alai players, Jose Fuerto, slammed the ball into a TI-CO Galvanized Sheet again and again—severely pounding it—but there wasn't a sign of flaking!

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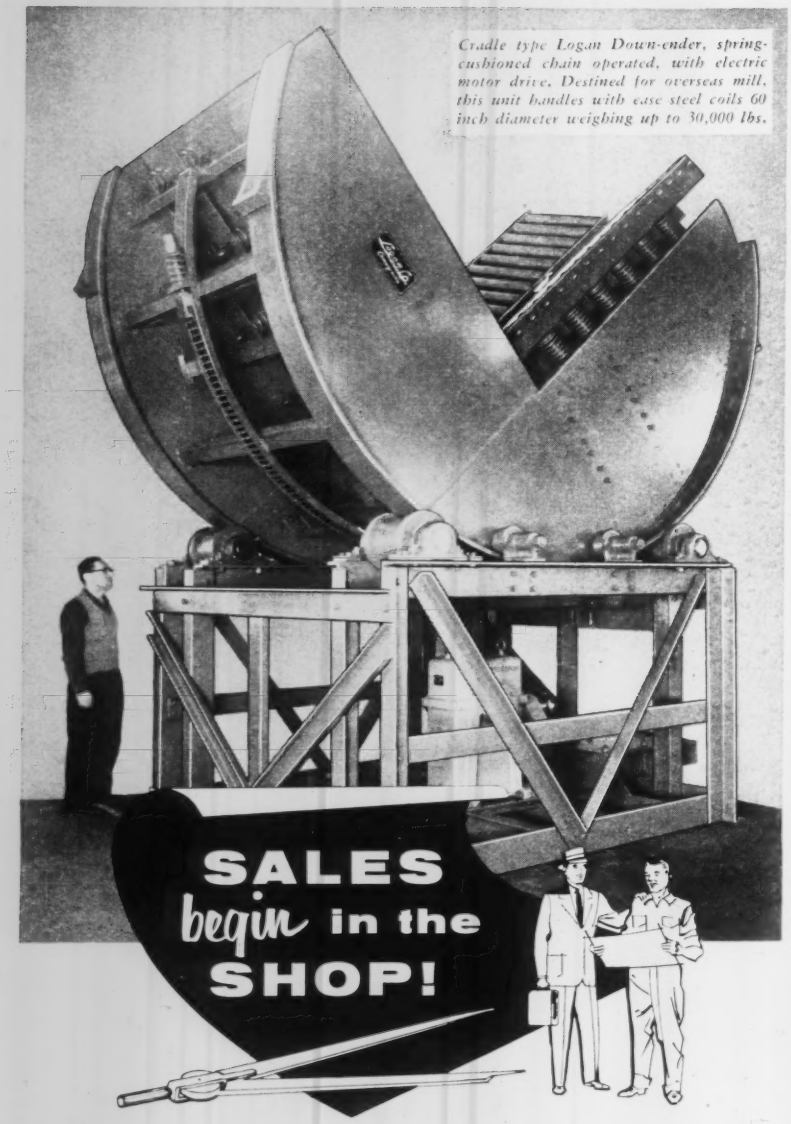
Cradle type Logan Down-ender, spring-cushioned chain operated, with electric motor drive. Destined for overseas mill, this unit handles with ease steel coils 60 inch diameter weighing up to 30,000 lbs.
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SAFETY . . .

of illustrations and a quality look. Its contents are split about 4 to 1 between safety on and off the job.

Discipline — Although formal codes make enforcement of safe practices easier, a man forgets once in a while. For purposes of enforcement, safety rules are considered in the same manner as all other work rules and subject to the same disciplinary action.

The job safety analysis is a big help in clarifying the safety rules. When men have to put on paper the things they have discussed and agreed upon, a lot of points are cleared up.

What about remuneration or prizes for improvement in safety? Bethlehem's attitude is that a man need not be rewarded in that way for doing what he should be doing. "Safety is an integral part of production."

Accident Procedure—Even when there are no personal injuries, the facts are determined by investigation. Otherwise, there could be a serious injury the next time. Once an accident occurs, the degree of injury is often a matter of luck. All accidents are investigated to establish corrective action to prevent recurrence, not to find fault.

Spirit—Some companies like to have departmental safety competitions. Bethlehem doesn't, on the theory that conditions in different departments vary so widely that any competition would be unfair.

But one form of competition is successful: A first aid program which has been going on since 1915. Every year at one plant 25 six-man teams are given 12 weeks of intensive first aid instruction (2 hours each week).

The course is tough. Every man who completes it receives the Bureau of Mines First Aid Certificate. Instruction ends with a field day competition for cash prizes. It's a big event. Wives and families turn out, and the men practice on their own for weeks before.

Trainees are selected with on-the-job requirements in mind: At least one man in every group of ten is a first-aid graduate. On hazardous jobs, the ratio is 1 to 6.

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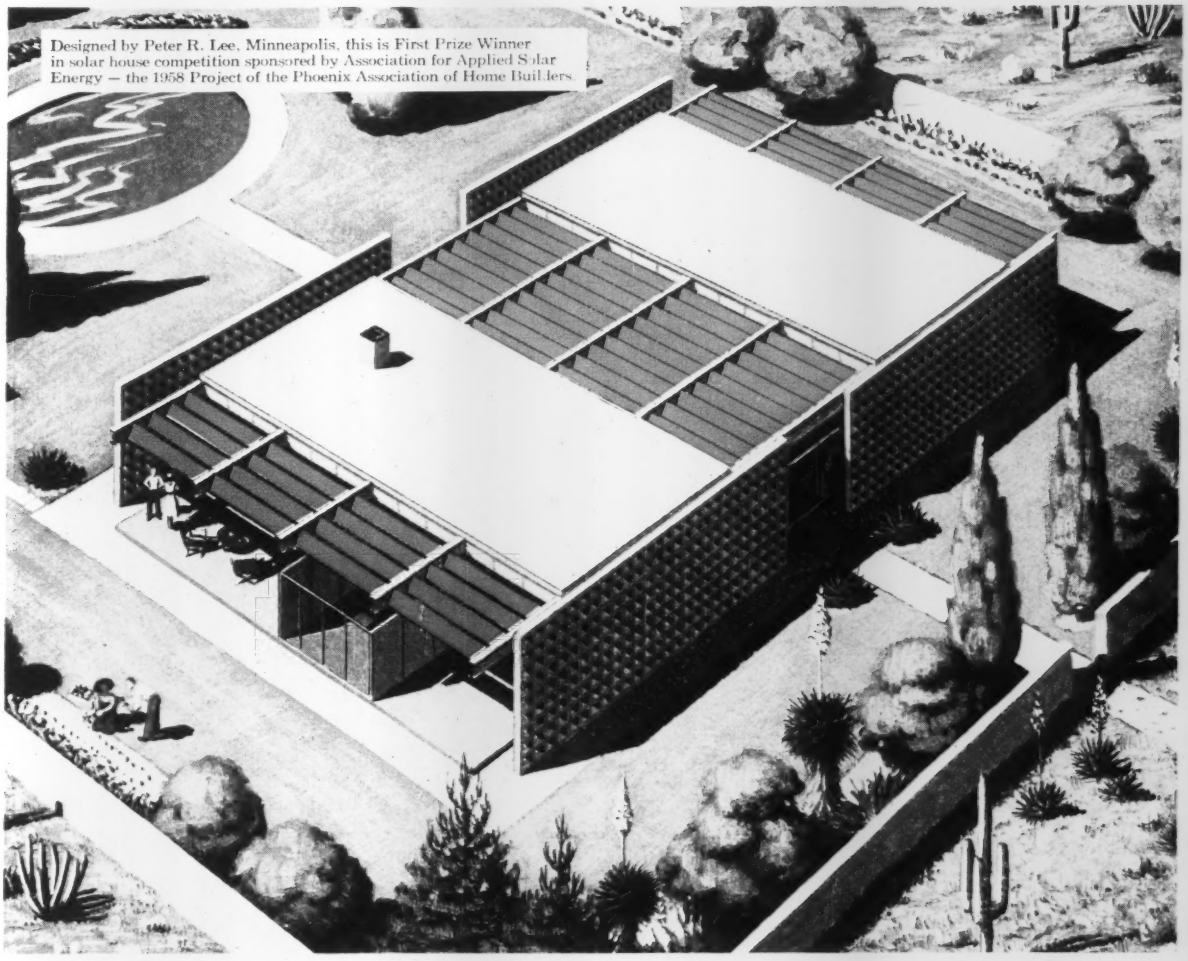

Designed by Peter R. Lee, Minneapolis, this is First Prize Winner in solar house competition sponsored by Association for Applied Solar Energy — the 1958 Project of the Phoenix Association of Home Builders

Now—thanks to COPPER the sun can heat your home!

Solar scientists turned to Copper to help harness the power of the sun. They've been so successful, your home today, and perhaps *all* future homes in certain temperate climates, can be heated in this dramatic, efficient way.

Here's how solar energy is put to work: Blackened Copper "collectors" on the roof absorb heat from the rays of the sun. This heats water circulating in Copper tubes built into the collectors. And the heat is then transmitted throughout the house by conventional methods. To take care of cloudy spells, heat is stored in large, buried water tanks.

Two of Copper's outstanding characteristics are emphasized by this advanced heating method. First, it is an unexcelled commercial heat transfer agent. Second, its resistance to corrosion makes it ideal for water circulation systems.

In addition, Copper and its alloys are easy to work, form, join, draw, stamp, polish and plate. And Copper's efficiency as a practical electrical conductor is unmatched. Let Copper help solve your problems. The industry's reserves are now at a record high, productive capacity is greater than ever.

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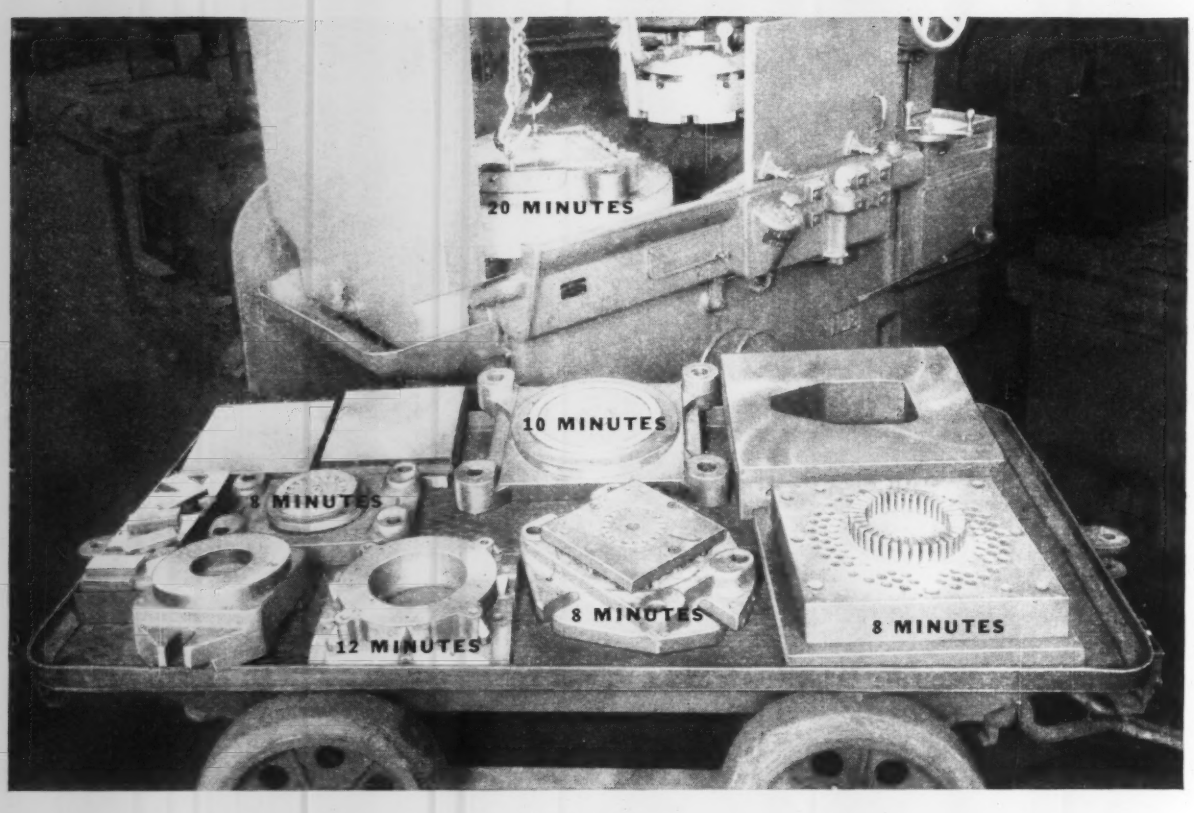

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The Blanchard method of die sharpening is unequalled for speed, safety and economy. All of the dies shown are sharpened on a Blanchard No. 18 Surface Grinder with equal ease.

The rotary work motion of the Blanchard, with the wheel covering the entire surface at each revolution, enables the operator to remove the amount of stock to sharpen the die and no more! This saves time and increases the life of the die, too.

The ample supply of coolant and the ability to use free-cutting wheels permit high grinding speeds without danger of burning the work. This extra speed reduces idle time on the presses.

Many shops use their Blanchards for die sharpening as well as all other surface grinding required in their manufacturing. The 3 Blanchards shown below cover work requirements from finishing tiny gears to roughing steel plates 84" across corners.

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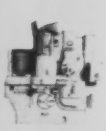

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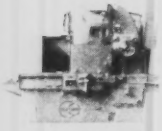

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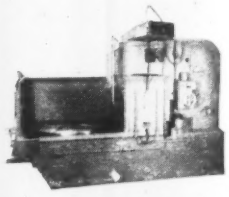

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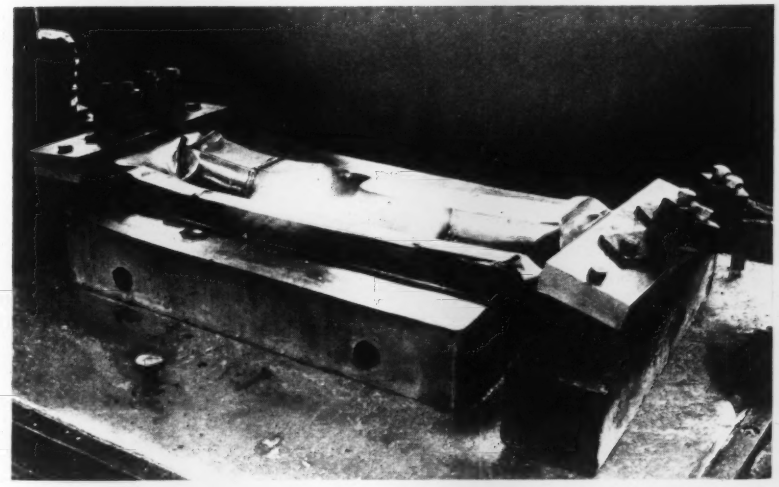

Titanium in position on lower drop hammer die. The transformer leads (left and right) are attached to aluminum tabs welded to the blank. Saturable reactor aids exact control

Hot Forming Titanium

Resistance method is used. Better control of forming temperatures is claimed. It works equally well on drop hammer or press brake. Welded aluminum tabs eliminate trim scrap

TITANIUM can be resistance heated and formed while hot.

Each end is fastened to terminal blocks connected to a GE Reactrol regulator, temperature controller, and a 50-kva transformer.

The inventors, Martin Co., Baltimore, say the device is highly satisfactory for press or drop hammer forming. It maintains closer temperature control than is possible with standard on-off type controllers.

Control—A Rayotube is used to check temperature. When used with a drop hammer, it is mounted clear of the hammer and focused on about the center of the sheet. (It works like a telescope.)

The Reactrol is connected in series with the resistance heating transformer and a current transformer. Saturable reactors permit infinitely variable heating control.

The current transformer produces a feedback signal which limits the amount of current flowing through the material. It has worked successfully on material 0.065 x 5 x 124 in. to 0.032 x 22 x 28 in.

When the titanium heats up, the Rayotube detects and records temperature rise on the controller. When a preset value is reached, power is reduced to maintain the correct forming temperature. Current is cut off and the forming stroke completed.

The titanium must be long enough to overhang the die and fit into the transformer lead connectors. Aluminum tabs are welded on each end of the blank in the trim area.

The titanium is insulated electrically from the lower form die by a thin layer of Sauereisen (cement compound).

The entire cycle is repeated if the part requires a second forming.

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Use FLOTRUSION*, a new and revolutionary method of cold flowing various metals into tubular forms of all shapes and sizes.

. . . meets demand for high production of parts previously requiring expensive and lengthy machining and polishing to hold dimensional tolerances and finishes.

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. . . maintain the same wall thickness with smaller or larger diameters **on the same tube.**

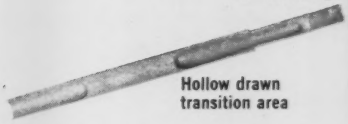
. . . form cylindrical sections with heavy wall sections at one or both ends, or in the center to provide for bearings, threads, weldments, etc.

. . . require only the exact amount of material necessary to produce the parts.

. . . on heavy sections, maintain the same O.D. as the tube body, with smaller I.D., or larger O.D. with same I.D., or both.

. . . increase tensile strength and improve grain flow by cold working and eliminating heat-treating.

NOTE: Heavy end for threading



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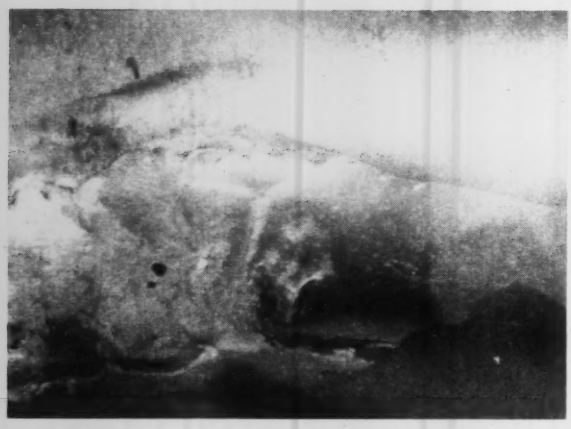

Fig. 1—Nickel silver deposit on 13-gage carbon steel stamping. At left, as deposited, at right, after burnishing

Fig. 2—Underside of deposit in Fig. 1. Peening has made it possible to get a heavy deposit

Fig. 3—The buffed nickel silver deposit blends with the steel. After plating, it cannot be detected

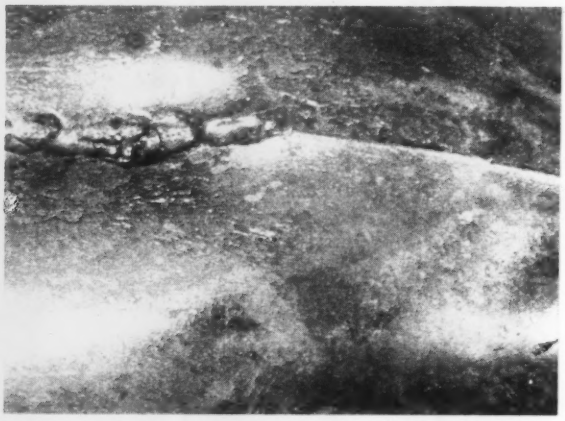

Fig. 4—Underside of deposit in Fig. 3. The crevice which starts at the end of the deposit is the root of the fusion weld

Brazing Salvages Cracked Stampings

Three procedures are necessary to make the technique work: 1. Peening the crack to widen it. 2. Employing a flame fluxing process. 3. Using nickel silver filler metal

By E. H. CONWAY
Sales Engineer
Gasflux Co.
Elyria, Ohio

HEAVY scrap losses in stampings and assemblies can be drastically reduced by the use of special brazing procedures that take into account the conditions in the workpieces and the requirements of the finished part.

Stampings that have been through a series of deep drawing operations, or assemblies that have been fusion welded, represent a considerable investment in processing operations. They make costly scrap.

Repair Methods—Fusion welding has been tried for repair and salvage but generally is not satisfactory because of the need for cleaning and the tendency toward distortion and hardened areas.

Torch brazing has proved effective for salvage in many cases. Some features of the brazing techniques used are simple but important in controlling cost and assuring maximum benefit.

History of a Part—Several features of a brazing repair on a welded assembly of two stampings are illustrated above. Both pieces of the assembly are formed to compound curves, placed in a fixture, and welded by a gas-shielded arc.

Occasional cracking occurs, dur-

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Rustproofing, Inc., President, Angelo Melone says: "Our automotive customers demand top quality brightness. ZB567 gives us an outstanding finish and enables us to meet competition and make a fair profit, too."

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- COST LESS PER POUND
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PERFORMS EQUALLY WELL IN BOTH BARREL AND RACK PLATING

Substantial benefits for the plating plant and its customers! That's just what the record shows for Wagner's new Iso-Brite ZB567® and until you get an opportunity to prove our claims in your own tanks, be guided by the experience of a progressive plating plant which has used Iso-Brite ZB567 for many months:

Rustproofing, Inc., Detroit, now uses Iso-Brite ZB567 exclusively for both its lines—barrel and rack—thus reducing inventory greatly. The cost is appreciably less than their former additive which, however, could not be used successfully in both lines. Also according to Angelo Melone, Rustproofing president, less additive is required to achieve high quality brightness and only small daily additions are needed to maintain full efficiency. In addition, Rustproofing's freight charges are nil since the Wagner warehouses are located close to the centers of mass production. And perhaps above all, Rustproofing keeps its many customers completely satisfied with the fully bright finish they specify; day to day reliability of ZB567 has reduced rejects to an insignificant minimum.

If your production requires the protection of zinc plating, plus the appeal of an attractive, bright finish, you're money and customer satisfaction ahead when there's Iso-Brite ZB567 in the tanks. If you're handling small "bulk" parts which must be barrel plated, you're doubly rewarded by the simplified inventory and low costs of this two-fisted new additive. Now—when increased operating efficiencies offer the only remaining opportunity for meeting and beating competition—investigate this vital Wagner Brothers development. For full information on Iso-Brite ZB567 and the entire Wagner electroplating line of equipment, anodes, chemicals and other supplies, call our representative in your area. He'll be glad to assist you with all plating department problems.

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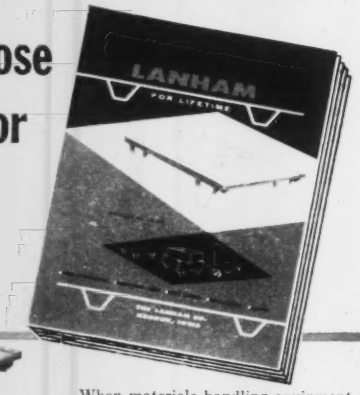

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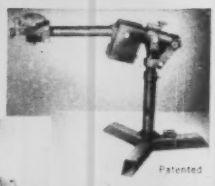

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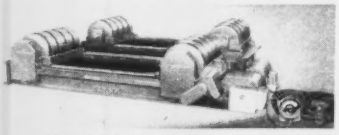

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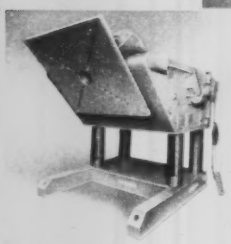
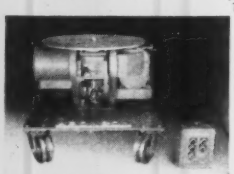
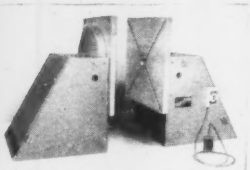


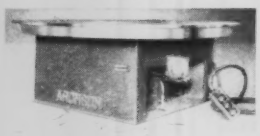
Fully Automatic Gear Driven Positioners, featuring Geared Elevation, 135° Tilting and Variable or Constant Speed Rotation. Capacities to 350,000 lbs.



Model D Gear Driven Positioners. Compact, Precise, Rugged. Capacities to 1000 lbs.



Rugged Head and Tail Stock for positioning bulky weldments between centers. Table Backup for Zero Deflection. Magnetic Braking. Capacities to 160,000 lbs. Geared Elevation Optional.



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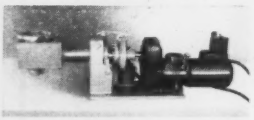

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ing or after welding, for a variety of reasons: Deep drawing leaves stresses; rigid restraint imposed by the welding fixture combines with the chilling action of the fixture to set up internal stress; improper welding conditions may result in overheating or in lack of penetration which leaves a notch effect on the underside of the weld.

Some cracks are caught at once. More develop under the pressure of the buffing wheel. A few show up after the copper plating operation which precedes chrome plating.

Repair Procedure—Even though the crack is small, the piece cannot proceed to final finishing until it is repaired. The best remedy in most cases is brazing. This involves minimum heat input and leaves a deposit soft enough to be smoothed by buffing.

When properly done, little time is required for salvage and the cost per piece of making the repair is only a fraction of its value. It is important that the repair be undetectable after final finishing.

Preparation of Work—The work is peened to form a small V-shaped depression the full length of the crack. That is to make sure the amount of brazing alloy deposited will make the area strong and rigid enough to hold when the buffing wheel hits it.

Before peening was adopted, parts often cracked during buffing.

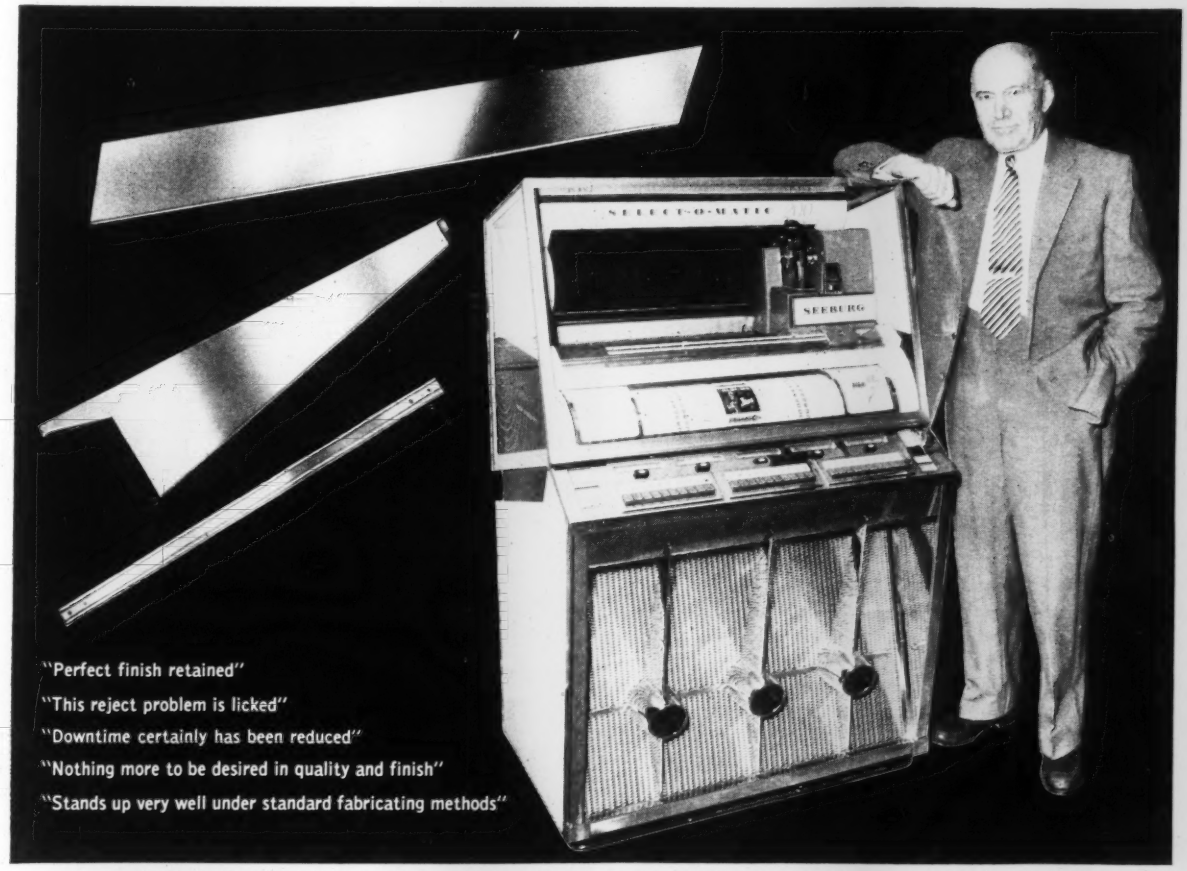
Torch Adjustment—Any of the common fuel gases can be used. Select a tip size that will permit a soft flame and still heat the metal rapidly.

The soft flame will make a smooth deposit that will require less buffing time. A neutral flame is recommended.

Fluxing—This operation is best done automatically, using the flame fluxing technique. A special container is connected to the line that supplies the gas to the torch. The container is charged with a highly volatile liquid which vaporizes.

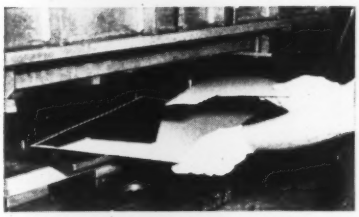
The fuel passes through the container, picks up a regulated amount of flux, and delivers it to the flame at the torch tip. No change is necessary in torch or regulators.

When the flame plays over the

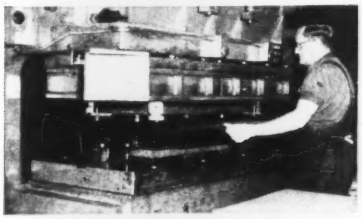

"Perfect finish retained"
"This reject problem is licked"
"Downtime certainly has been reduced"
"Nothing more to be desired in quality and finish"
"Stands up very well under standard fabricating methods"

K. R. Craft, Vice President, The Seeburg Corp., Chicago, with one of the company's famous juke boxes. The brilliant reflectivity and durability of Nickeloid pre-plated metals is an important factor in the product's eye-catching good looks.

NICKELOID METALS SAVE 4 PRODUCTION STEPS— REDUCE REJECTS FOR THE SEEBURG CORPORATION



Standard fabricating methods are used to stamp and form juke box trim. Nickeloid Metals eliminate machinery tie-up; rejects are less than 1%.



Stamping Nickeloid chrome steel, protected with Mar-Not adhesive-backed paper which is easily peeled off. Finished part will need no polishing.

Pre-Finished Design Material is Easily Worked With Standard Fabricating Methods

The Seeburg Corporation uses Nickeloid *pre-plated* chrome steel to achieve functional beauty and attention-value . . . economically. Before switching to Nickeloid, the company did its own cleaning, plating and buffing. The job required four — sometimes five more operations than are now necessary. According to Mr. Craft, "The tremendous cost of plating and buffing was not only more expensive and much more time consuming, but the finished product had to be inspected, and the rejections on plated and buffed metals was very much higher than it is with Nickeloid. Economically, the Nickeloid Metals have proved themselves in production."

Using standard fabricating methods, Nickeloid Metals need only be stamped and formed — then assembled. By capitalizing on this pre finished *method* of production, this leading manufacturer has eliminated the machinery formerly required for plating, polishing and buffing — saved four or five production steps, and is producing a better end product *with less manpower*. Can you use these advantages in *your* operation?

14 finish-to-base metal combinations — sheets, coils, strips.

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NICKELOID METALS SINCE 1898

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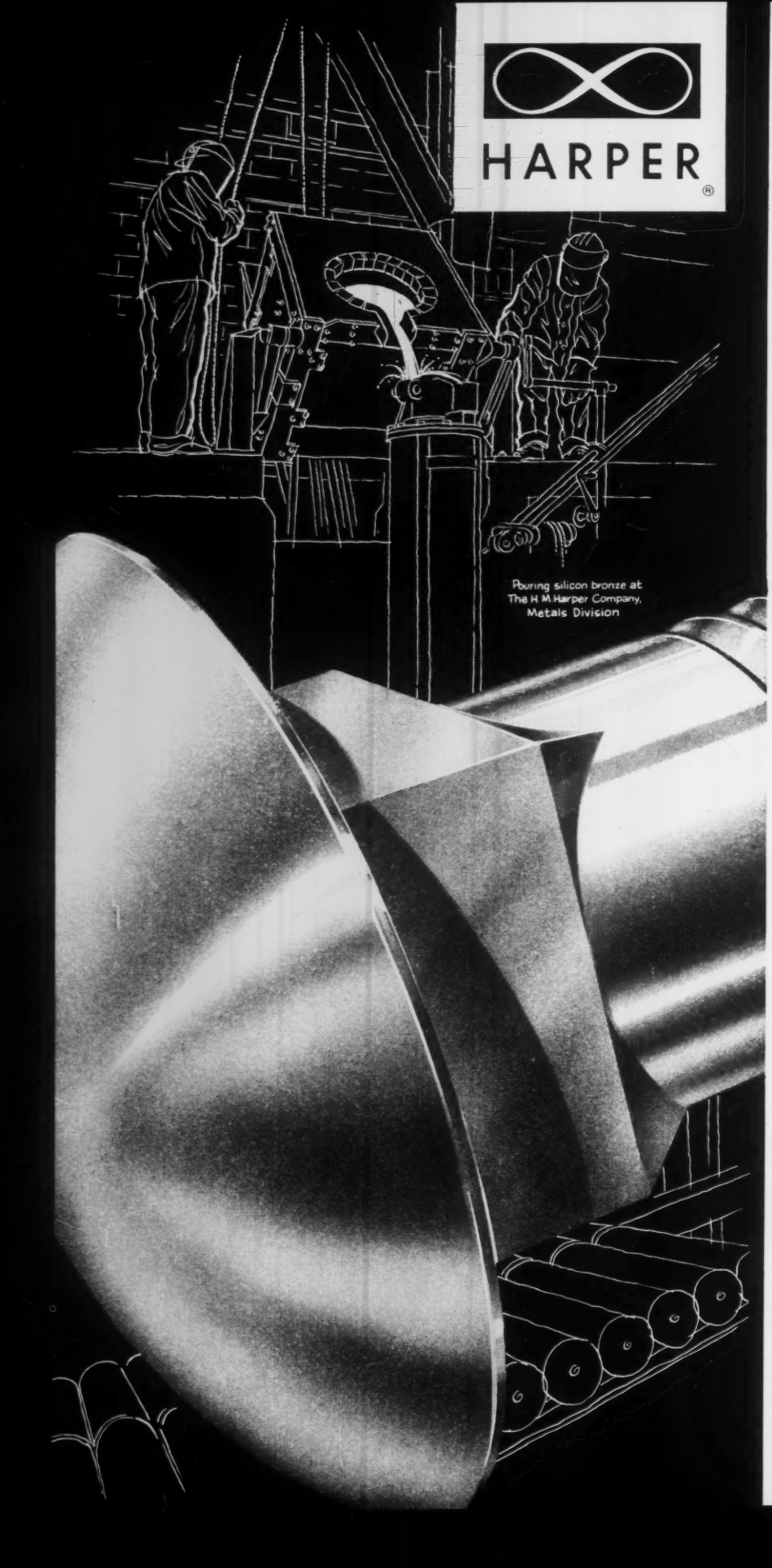

BRAZING . . .

metal, flux in the flame prevents oxidation of the surface. The flux gives the flame a slight greenish tinge. No glassy hard flux residue is left on the work to create a cleaning problem. In some cases, the flame fluxing technique has saved up to 30 per cent in brazing alloy consumption.

Brazing Alloy — Nickel silver (white brass) brazing filler rod is recommended for this use. A good analysis for brazing purposes is copper 48.58, zinc 41, nickel 10.25, silicon 0.15, phosphorus 0.02 per cent.

It makes a stronger braze than low-fuming bronze rod. It costs more a pound, but not as much is required. The deposit is dense, does not crack, and is a good color match for steel.

An area brazed with bronze rod and then plated often has a slightly different sheen than the adjoining surface. When viewed at certain angles, the band of brazing alloy is silhouetted so that it is easy after plating to identify the pieces that have been brazed.

With nickel silver, there is no difference in the plated surface.

Another difficulty encountered with the bronze rod is a tendency of the deposit to flatten while being buffed and to break away. This does not happen with the nickel silver deposit.

Brazing Operation—It is good practice to brush the surface along the beginning of the crack with the flux-bearing flame. This cleans the surface and helps the initial wetting when the brazing alloy begins to flow.

Continue application of the flame to bring the metal up to brazing temperature, then complete the braze in the usual manner.

Drawing Cracks—A similar procedure used on stampings that crack in the final drawing passes can result in substantial savings, especially in deep drawn parts in relatively heavy gages.

Use of flux-bearing flame is an advantage because no separate cleaning operation is required before or after the braze. Cracking often is so severe that an appreciable gap is formed and peening to form a deep trough is impractical and unnecessary.

Filler Metal—For this applica-

tion, low-fuming bronze rod is recommended. The low heat input (it melts at 1600° F) speeds the work and eliminates distortion problems. The alloy flows well and does not lose much of its alloying elements if care is taken not to overheat.

Deposits are generally strong and dense, free from porous areas, and have smooth surfaces. The bronze rod makes a strong bond with the steel when the part is heated only to a dull red. Another desirable feature of the rod is that it will bridge a gap. Sometimes the cracks open up 3/32 in. or more, but the parts still are reclaimable.

Flame Adjustment—Use a neutral flame. Adjust the flux regulating valve to secure the proper greenish tinge in the flame, which indicates the correct quantity of flux is being supplied.

Use a tip large enough so that a soft flame can be maintained—one that will not blow the filler metal away, but will flow it evenly to leave a smooth surface on the deposit.

Making the Braze—Always set the work so the braze can be made in the flat (downhand) position. Brush the flame back and forth along the crack to flux the surface and bring the metal up to brazing temperature.

When the base metal shows dull red, the filler rod can be placed in the flame. As it melts, it will flow over the surface that has been fluxed by the flame. A slight swinging motion of the torch will help to avoid overheating the bronze (which would cause the zinc to boil out and make the deposit somewhat porous).

Try to maintain a uniform travel speed, using just enough heat to allow the bronze to bond with the steel. When conditions are satisfactory, the metal from the rod will flow smoothly ahead of the flame, and when the flame is withdrawn from the surface of the bronze deposit, it will be clean and bright.

Why It Pays—The great economy of these methods of salvage lies in their single, easy operation. Savings that can be realized depend on the size of the parts and the amount of production work that has been done on them before cracking occurs.

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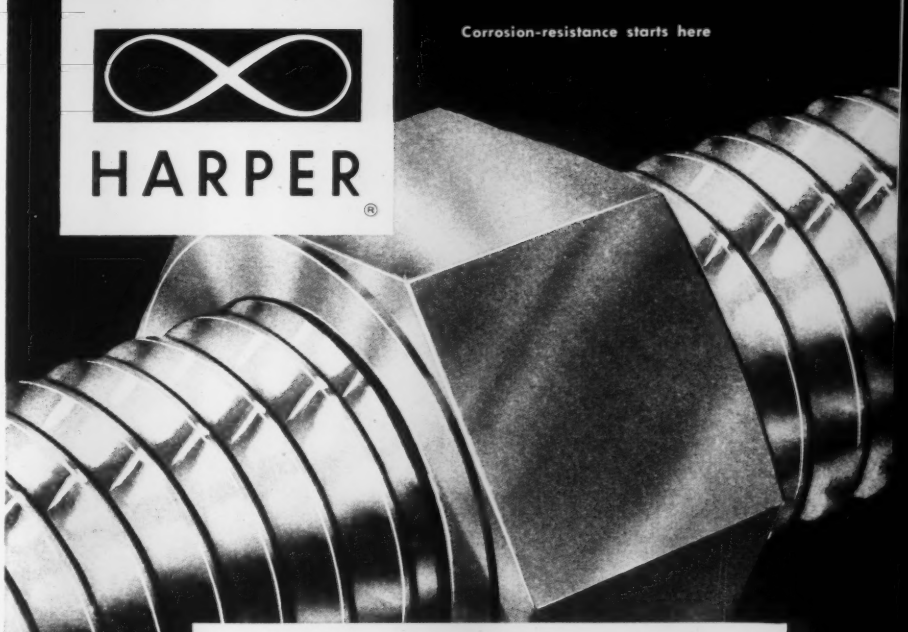
Corrosion-resistance starts here



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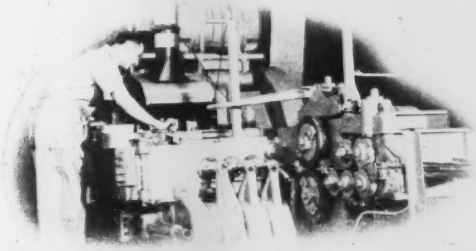
Harper's knowledge of the corrosion-resistant fastening business—gained from our 35 years of leadership in this field—assures you of the finest fastenings for any service whatsoever. From tiny screws used in an electronically guided missile—to heavy, high-heat-resisting bolts used in a chemical plant—there is one responsibility, one quality standard, and complete assurance of satisfactory service.

Coupled with immediate availability of thousands upon thousands of standard Harper Corrosion-Resistant Fastenings from your nearby Harper Distributor—who adds more years of specific fastening experience—you are as near as your telephone to the world's finest corrosion-resistant fastenings.



Operator observes .734" wire being headed into finished bolts

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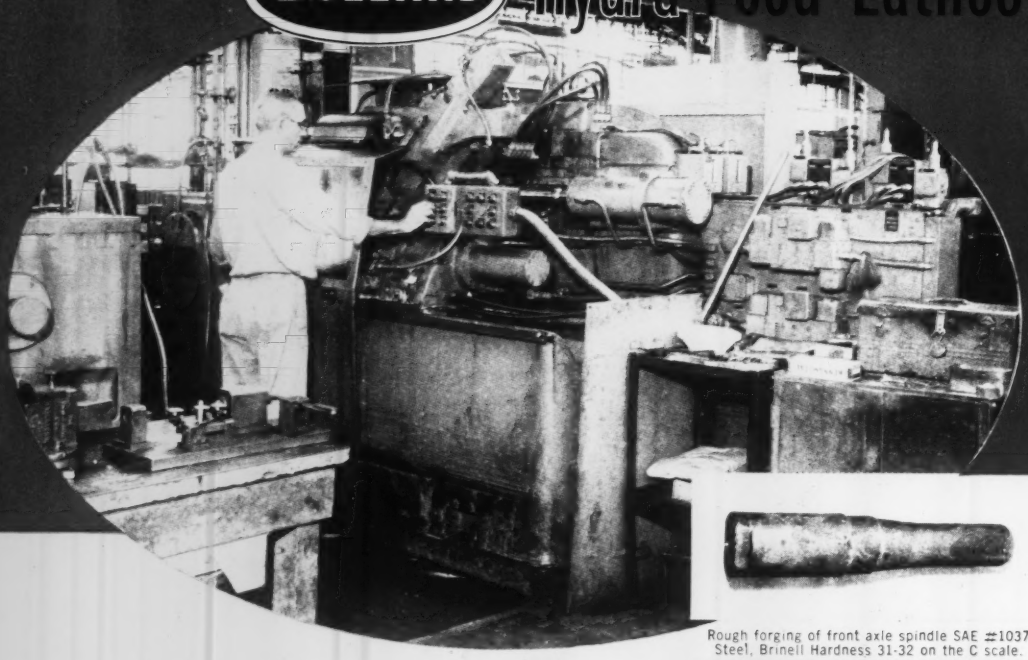

Rough forging of front axle spindle SAE #1037 Steel, Brinell Hardness 31-32 on the C scale.

The Senior Engineer at one of the leading motor car manufacturers in Detroit, was looking for a tracer lathe that went beyond his immediate requirement and offered easy conversion to other uses in years to come, to give longest tool life, to do the job with a minimum of shutdown time, to handle future developments in the realm of cutting tools, to reduce scrap to a minimum.

The answer to this multiple problem, according to the Senior Engineer was "BULLARD HYDRA-FEED TRACER LATHES."

We invite you to investigate the advantages which Bullard Hydra-Feed Lathes, either tracer or multiple tool models, offer you. Phone or write your nearest Bullard Sales Office, Distributor or

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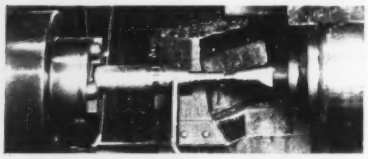
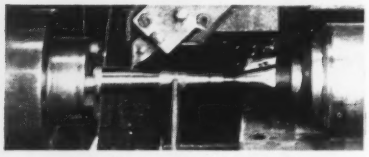
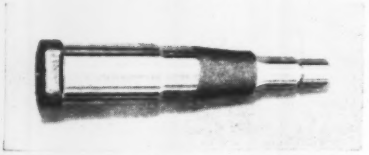


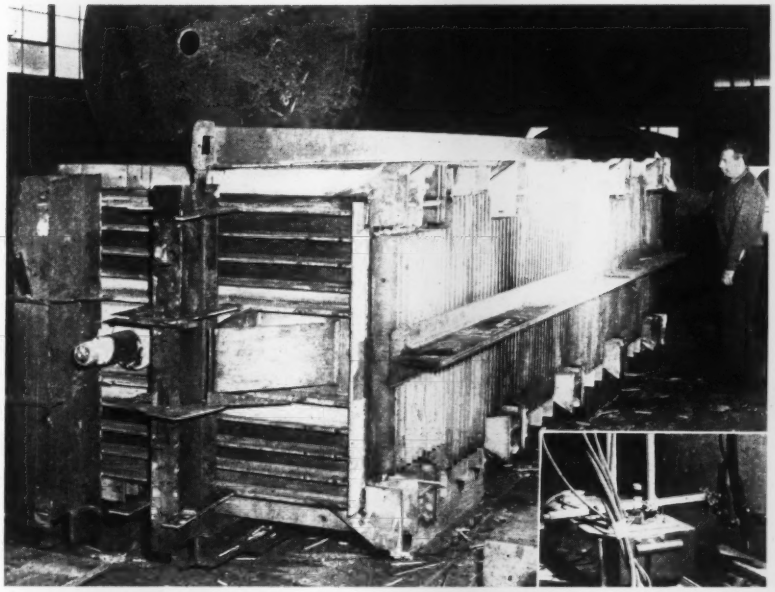
Rough turning with Rear Tracer Slide.



Finish turning with Right-Hand Top Tracer Slide



Finished piece complete cycle time — 65 seconds.



Transportation cask has more than 13,000 ft of welds. Inset shows Aircomatic head mounted on a Radiagraph which speeds welding of cooling fins

Handles 'Hot' Stuff

Vessel for transporting radioactive fuel presents unusual welding problem. Firm uses standard Aircomatic mounted on a Radiagraph to fasten almost 400 cooling fins

RADIOACTIVE fuel elements must be heavily shielded during transportation.

A cask is used for that purpose. Its walls contain lead 8¾ in. thick which is homogeneously bonded to a stainless steel interior and a carbon steel exterior. It has fins for cooling.

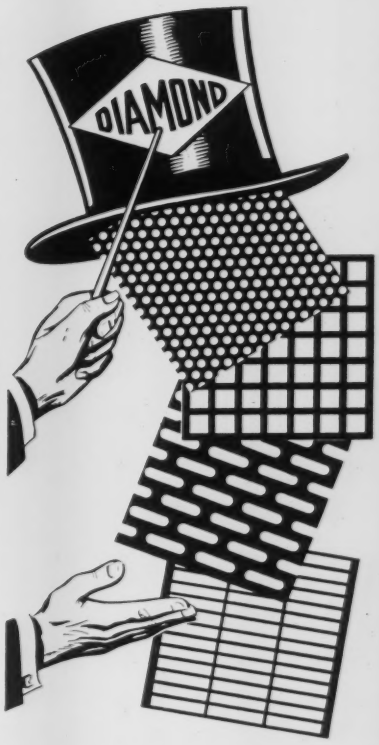
Purpose — The vessel is one of eight being fabricated by O. G. Kelley & Co., Neponset, Mass. They will be used to transport fuel elements to nuclear reactors like those in two Navy submarines, *Nautilus* and *Seawolf*, and other prototypes.

Each cask requires more than 13,000 ft of welding on stainless clad metal. Scaffolding used with the fabrication permits welding with a No. 21 Aircomatic gun mounted on a No. 41 Radiagraph. It uses Type 308 stainless filler wire. Shielding gas is a mixture of argon and helium.

Each side of the vessel has 98 fins. Specifications call for full penetration welds on ½-in. metal with 45-degree bevels.

A heavy backup bar was clamped under each angle-fin to minimize warping during welding. The fins were welded with the vessel upright to obtain the benefits of a flat welding position.

Other Products—The Kelley firm uses the same methods to fabricate lead bonded and lined vessels for ordnance, TNT, chemical and acid plants, and the petroleum industry. When they are too large to transport, the vessels are shipped knocked down and erected in the field.



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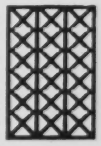
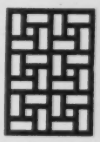
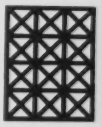
IN
Perforated Metal

The popular Diamond Perforated-metal patterns shown above are only a few of the many illustrated and described in our 32-page Catalog No. 39. All of these standard patterns are available in a wide range of unit-opening sizes and we are always equally pleased to quote on original designs of any type or size.

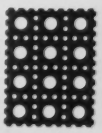




Catalog 39 also illustrates and describes our high-quality lines of *Ornamental Cane*, Perforated-Metal Sheets for Accoustical installations and Heavy-Duty Architectural Grilles. Write, today, for a free copy.



Correspondence is especially invited regarding ANY requirement for perforated-metal panels or parts. We are equipped to fabricate special sections to any desired extent and welcome opportunities to make money-saving suggestions.



DIAMOND MFG. CO.
WYOMING WILKES-BARRE AREA PA.
West Coast Plant,
DIAMOND PERFORATED METALS CO.
17915 So. Figueroa St., Gardena, California
Los Angeles Area

Eastern's research, development and production facilities, devoted exclusively to stainless steel in sheets and plates, are available to you through the finest

distributor warehouse network

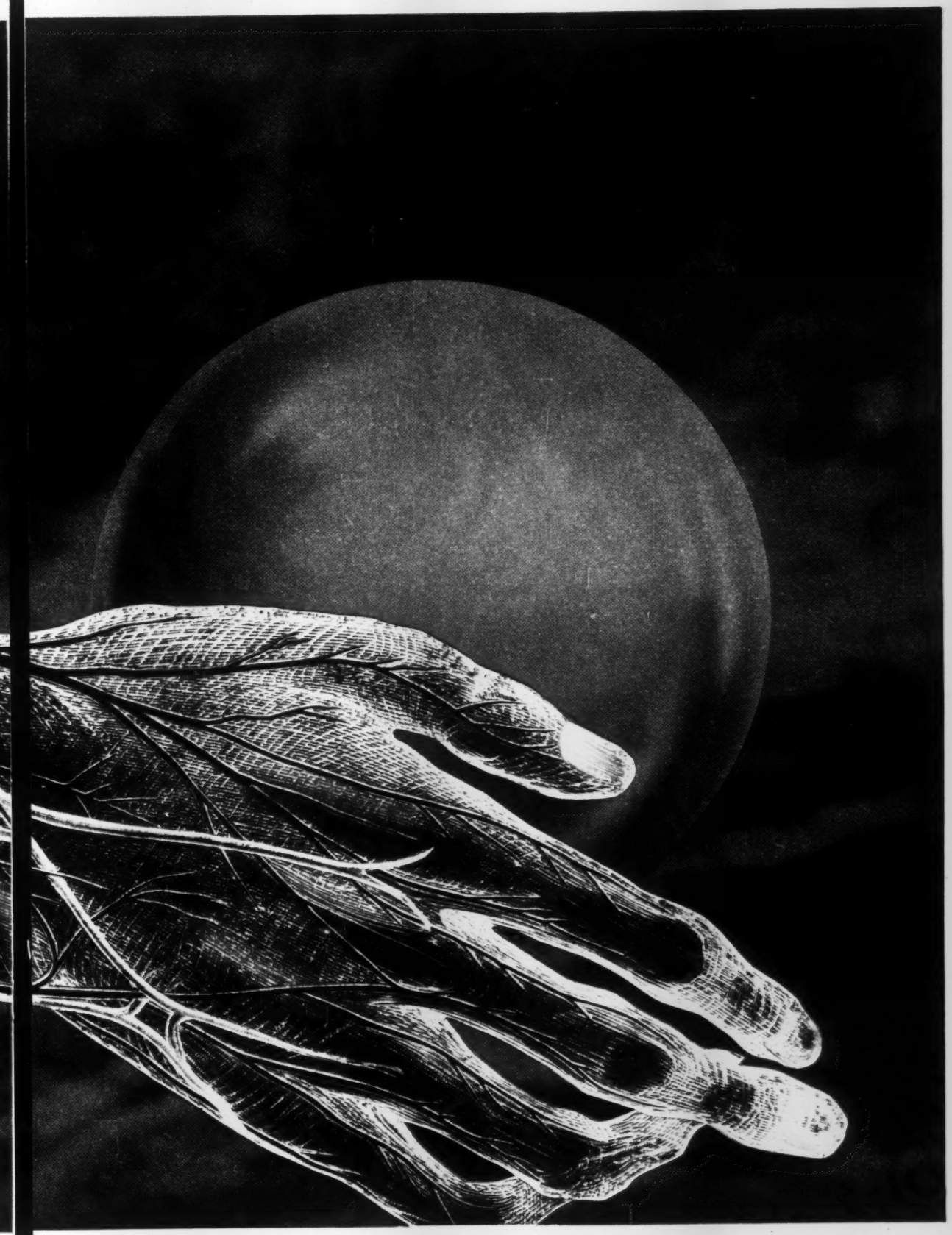
in the whole bright new world of stainless steel.

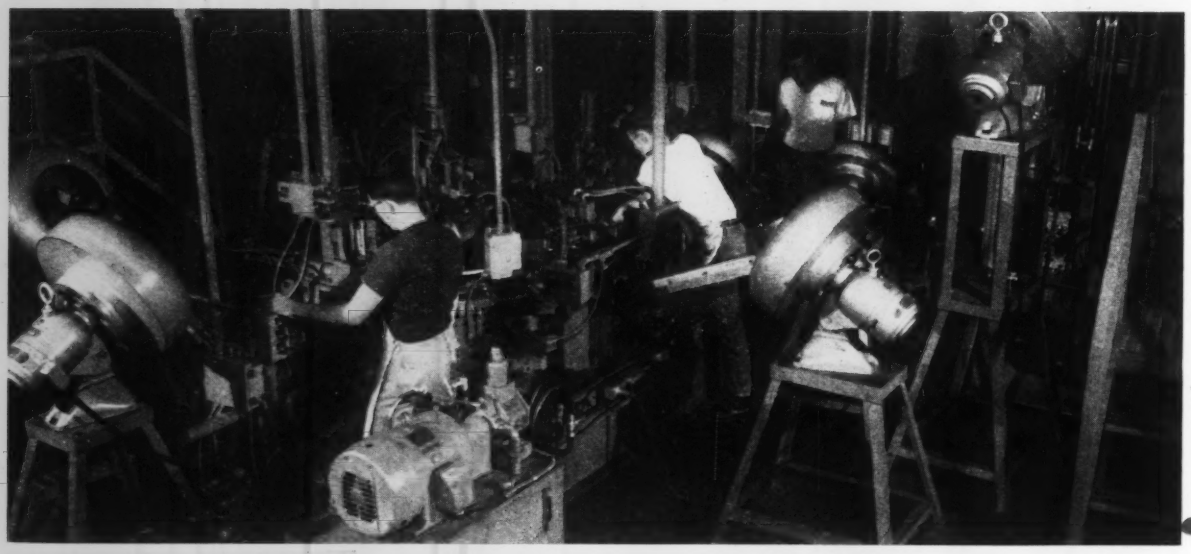
Your local steel service center offers prompt service, an opportunity to reduce your inventory, and quick delivery of in-stock materials.

ES

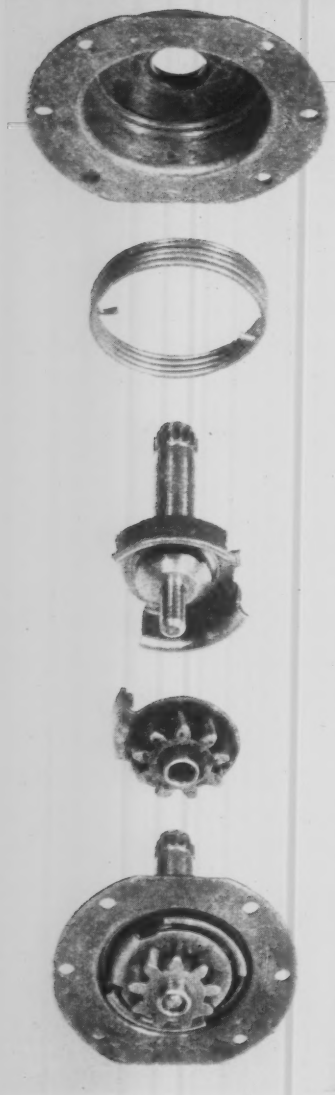
Eastern Stainless Steel Corporation • Baltimore 3, Maryland, U.S.A.

ANATOMICAL DRAWING, courtesy of The MacMillan Company, "An Atlas of Human Anatomy" by Carl Toldt, M.D. © 1928





This is the Ford automatic assembly machine at Sandusky, Ohio



Clutch parts move up in this order. (Finished part below)

Automatic

Such equipment speeds output, ups quality, cuts production costs, reduces manpower. Here is how a window regulator is assembled. Stations can be added for new parts

EVERY year auto plants assemble more components automatically. One of the latest additions to the list is Ford's window regulator, which has 13 parts.

The new Hardware Div. plant at Sandusky, Ohio, does the job on an assembly machine that's essentially two transfer lines in one. It turns out approximately 900 assemblies an hour.

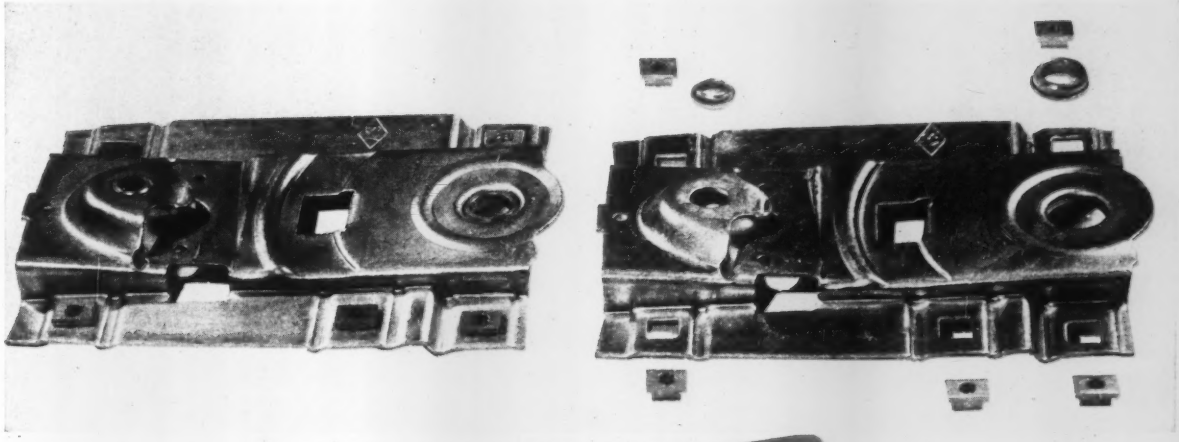
Co-ordination—Three operators and several automatic hoppers feed parts to the machine. One line handles the plates, bushings, and clinch nuts. The other assembles the shaft, gear, and clutch.

The transfer line picks up a base plate, places and stakes five clinch nuts.

Hoppers then feed and assemble a large and a small bearing bushing.

The other transfer line picks up a clutch drive housing. At succeeding stations, it gets a spring, stem and cup, cam and gear, and automatic lubrication.

The subassemblies meet at the final station. After



Base plate, clinch nuts, and bearing bushings move toward the left

Assembly Moves Ahead

locating, a riveting machine fastens the clutch drive assembly to the plate.

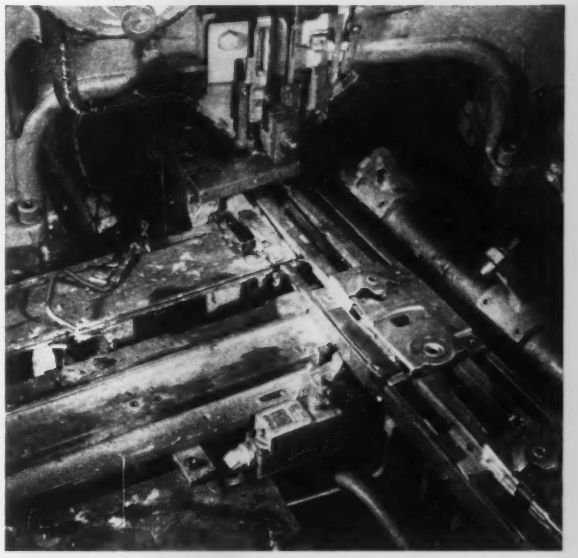
Thinking Ahead—The plate assembly line has 14 stations; the one for the clutch drive has 12. Present operations require only 11 of the 26. The extras allow great flexibility for revision.

Design—Compressed air, hydraulics, and electric motors furnish the power. Parts are carried in fixtures mounted on endless chains, which are hydraulically driven. Hydraulic pistons drive the loading devices.

The builder, Trio Tool Co., Detroit, selected an in-line design because of space requirements. Rotary tables, preferred by many engineers, can be loaded from the outside only. A transfer line can be loaded from both sides.

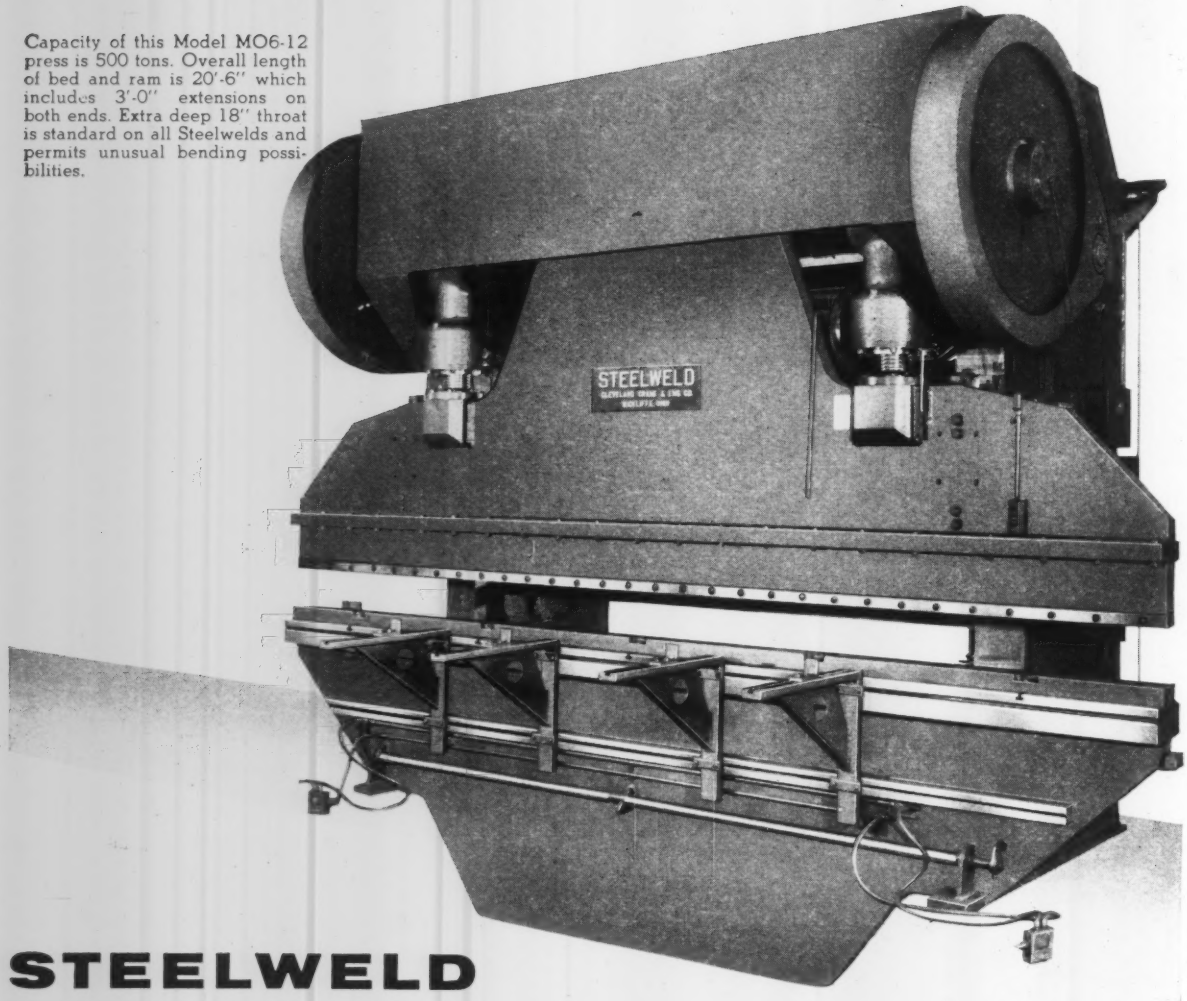
Working with Ford engineers, Trio Tool designed and constructed the machine in about 15 months.

Plant—The Sandusky plant makes a wide variety of other hardware parts for Fords, Mercurys, Edsels, and Lincolns. They include moldings, tail lights, locks, and engine air cleaners. The plant has more than 600,000 sq ft of floor space, aluminum and zinc die-casting machines, automatic platers and buffers, and an electrostatic paint spray system. Several large presses with multiple station transfer dies automatically form air cleaner housings from coil stock.



Here is the junction of the two assembly lines. Clutch assembly (left) gets shot of lubrication. Riveter is just ahead of the base plate (right)

Capacity of this Model MO6-12 press is 500 tons. Overall length of bed and ram is 20'-6" which includes 3'-0" extensions on both ends. Extra deep 18" throat is standard on all Steelwelds and permits unusual bending possibilities.



STEELWELD

PRESS BRAKE Designed For Special Gooseneck Punch and Standard Dies

THIS Steelwelds Brake was designed to take a special gooseneck punch and, for this reason, has a shut height of 30 inches. However, it will also accommodate standard dies because the ram is provided with an extension, as shown, which brings the shut height down to 16 inches.

The bed has a slide rail on which is mounted four brackets, adjustable up and down and along the bed, for supporting materials going through the machine. The brackets have adjustable stops that enable gauging the width of metal being formed.

STEELWELD
PRESS BRAKES

Like all Steelweld Brakes, this press was designed to permit hairline accuracy. Under full load the average deflection will not exceed .001 inch per foot between housings. An important reason for this accuracy is the unusually rigid frame which was fabricated entirely of rolled steel plate and welded into a one-piece integral unit. Another is the extra deep bed which extends 2'-6" below the floor.

The machine has a 6-inch stroke with two speeds of 7 and 20 strokes per minute. The clutch is air-operated and controlled by two foot-operated valves. A reversing flywheel permits reversing the ram at any position of the stroke.

The Steelweld Brake design is readily adaptable to suit special requirements. Our engineers will be glad to work with you on press brake and heavy stamping problems.

Write for free copy of Catalog No. 2010

STEELWELD DIVISION · THE CLEVELAND CRANE & ENGINEERING CO. · 7867 E. 281 ST. · WICKLIFFE, OHIO

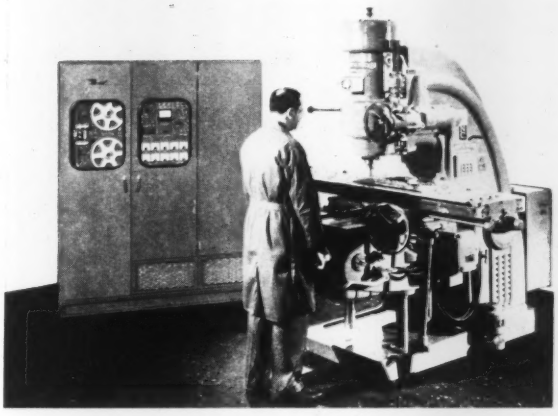
Positioner Handles Weldments for Drilling, Milling

This positioner is rated at 5 in. overhang, 22 in. eccentricity, and 6000 lb capacity. The table is 7 ft 4 in. in diameter, machined with T-slots, and is designed to withstand a 1000 lb drill force at the table edge in any direction.

Special features include: Two-speed tilt and rotation drives; powered horizontal movement, allowing 36 in. travel; manual shot pin locators on table rotation, with intermediate position friction brake; a scale to mark table degrees, and a protractor to measure tilt.

Positioners are available in capacities from 100 to 60,000 lb. *Write*: Pandjiris Weldment Co., 5151 Northrup Ave., St. Louis 10, Mo. *Phone*: Prospect 6-6893

Tape Control Simplifies 3-D Milling Operations



The 2CH numerically controlled milling machine is rated at 5 hp. Spindle speeds are from 25 to 1500 rpm. The 315TF and 415TF are heavy duty models, have twin elevating screws and 24 speeds from 15 to 1500 rpm.

These machines handle small and medium work on ferrous and nonferrous metals.

Power for short feed motion is transmitted through recirculating ball screws.

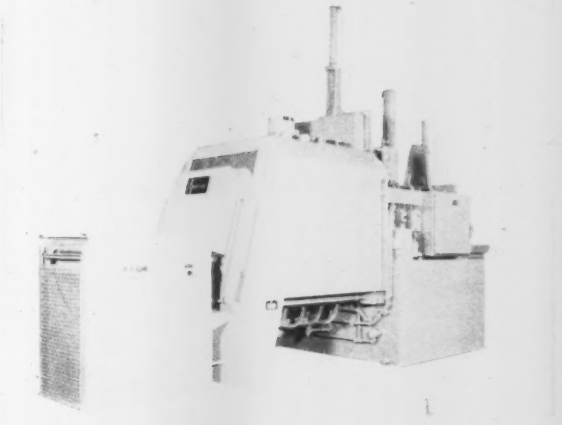
Tape control systems (Bendix, GE, or ECS-Digmatic) are furnished. System selection is determined by job, price, and computer facilities available. Any of these controls will fit any model. Tape preparation is available. *Write*: Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis. *Phone*: Greenfield 6-8300

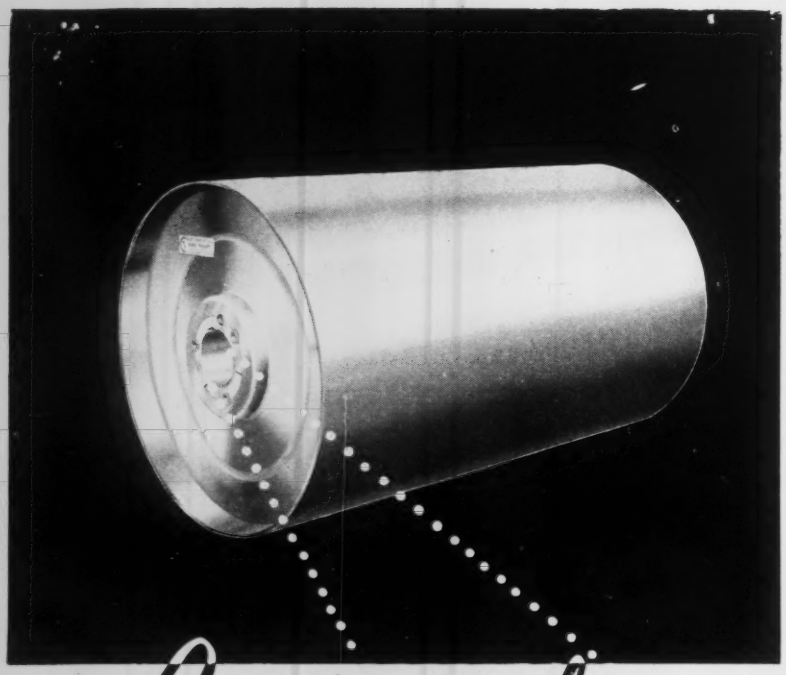
Heat Treat Unit Is Faster Cooling and Quicker Burning

These high temperature furnaces burn quietly and without tail flames. They have alloy burners, a 100 per cent air-gas premix system, alloyed ceramic heating tubes, and flame-buster links that will stand temperatures to 2800° F.

One-piece cast fan and shaft assemblies, cast meehanite door plates with machined ways to improve sealing, heavier alloy inner doors, and changed design of the refractory arch add strength to these units.

Cooling capacity for quenching is increased by the use of multifinned cooling tubes. A heavy duty motor with an oversize shaft insures proper circulation of the quenching medium. Provision is made for the continuous lubrication of drive components. *Write*: Ipsen Industries Inc., 721 S. Main St., Rockford, Ill. *Phone*: 5-9581





Continental

Welded Steel Pulleys with "TAPER-LOCK"® HUBS

Continental Welded Steel Pulleys are furnished with "Taper-Lock" Hubs and bushings — giving the equivalent of a shrunk-on fit while permitting easy assembly and disassembly.

Welded steel construction combines maximum strength with minimum weight, and also excludes dirt and water.

For further information on Welded Steel Pulleys write for Bulletin ID-134.

CGC

INDUSTRIAL DIVISION

Continental Gin Company

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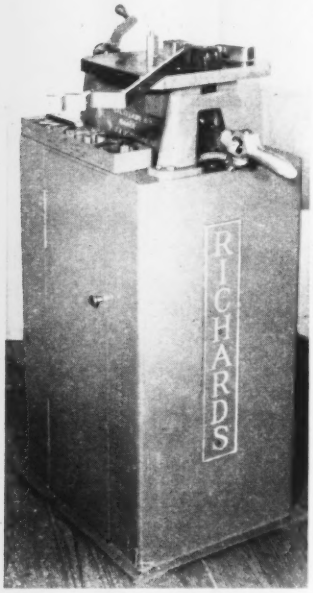
NEW PRODUCTS and equipment

Hydraulic Bender

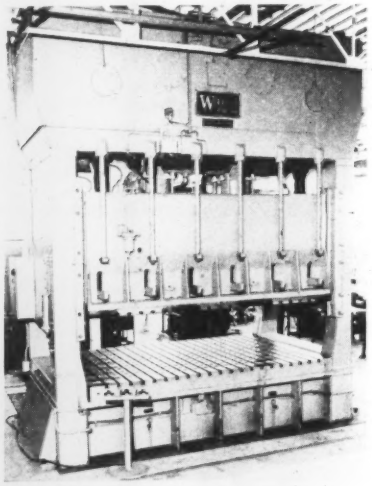
The Multiform No. 6 is a self-contained unit for bending steel or other material up to 3/16 by 2 in. Bending power is 7000 lb plus. It

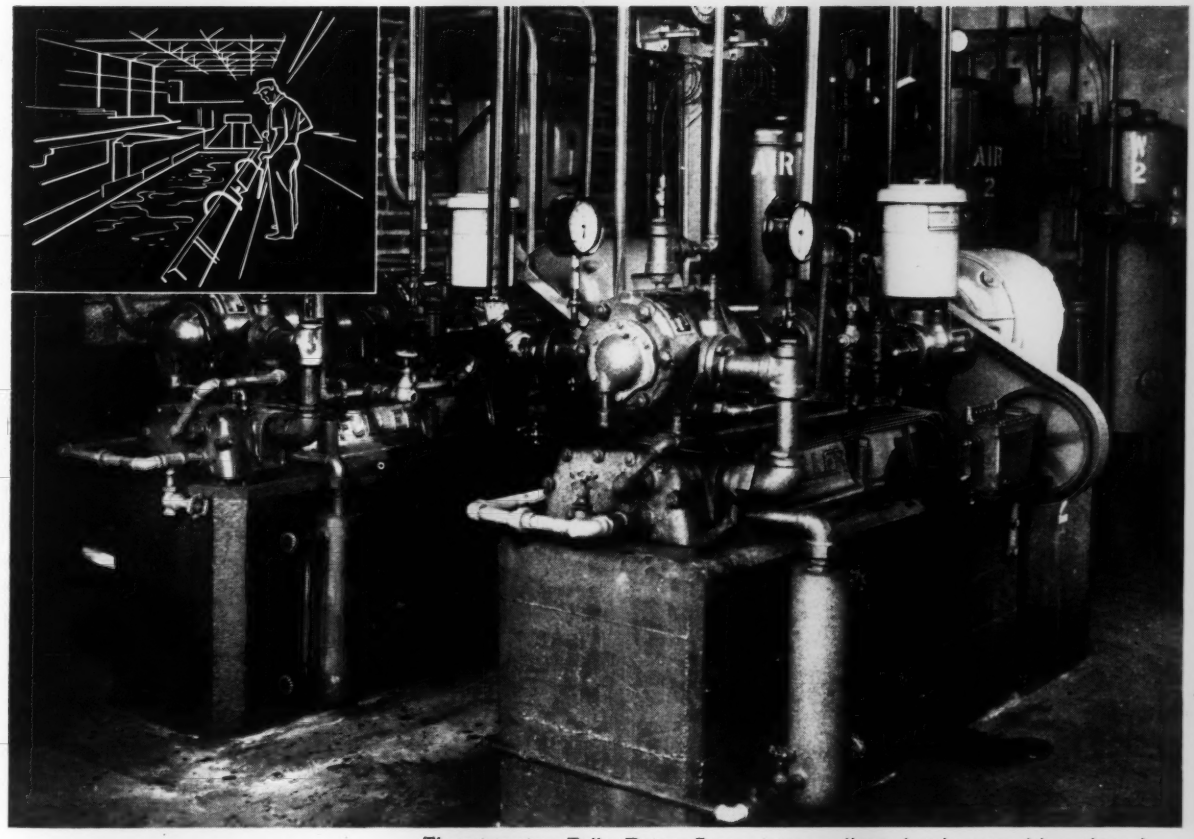


measures 28 by 17 by 42 in. and weighs 300 lb. *Write*: J. A. Richards Co., 903 N. Pitcher St., Kalamazoo, Mich. *Phone*: Fireside 3-4684

Press

This welded steel, double back geared, four-point eccentric gear press operates at 14 strokes per minute. The frame is the steel tierod type. Capacity ½ in. from bottom of





These two-stage Fuller Rotary Compressors are direct electric motor driven through flexible couplings to provide compressed air for a large eastern steel company.

5 YEARS WITHOUT A HITCH!
. . . FULLER Rotary Compressor
helps keep steel plant operating around the clock!

Compressed air is so vital in the alloy tube division of this large eastern steel company, that the plant would have to shut down without it!

The chief maintenance engineer of the company writes: "The first Fuller Rotary Compressor was purchased on the basis of experience by other users and cost comparison with other compressors.

"The second Fuller Rotary Compressor was purchased on the basis of the fine performance given by the first compressor. The most outstanding feature of Fuller Rotary Compressors is that they give trouble-free continuous operation".

Fuller rotary compressors can be installed in limited quarters and on ordinary flooring. They give long life and smooth operations. The elimination of valves, crankshafts, pistons and other moving parts greatly reduces the need for attention, adjustment and replacement. Blades are held out by centrifugal force, automatically compensating for wear, thus maintaining new machine efficiency and capacity. The rotary principle permits a design completely free of reciprocating parts, avoiding the basic cause of pulsation.

There is a Fuller Rotary Compressor to fit your particular needs. Write today for complete details.

"See Chemical Engineering Catalog for details and specifications."

Fuller

FULLER COMPANY GENERAL AMERICAN TRADE MARK

FULLER COMPANY C-324 4915

160 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

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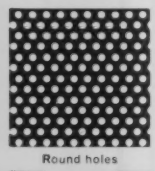
PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

H&K PERFORATED MATERIALS

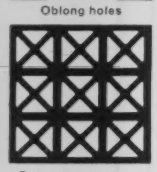
for Industrial or Decorative Uses

THOUSANDS OF DIFFERENT PATTERNS AVAILABLE



Round holes

Oblong holes

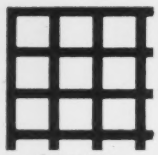


Decorative patterns

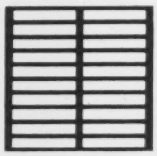
H & K facilities enable the perforating of all metals, wood, plastics and cloth fabrics. Perforated materials can be furnished in sheets, coils, rolls or plates. Fabricating services include shearing, rolling, welding and forming.

Perforated metal can be ordered with special finishes: aluminum—color anodized or brushed and lacquer finish; steel—painted, chrome plated, enameled, japanned or other baked-on finish. Decorative patterns can be embossed if requested.

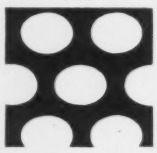
Many patterns in steel sheets (industrial or decorative) are in stock at our warehouses. Send for H & K Stock List Brochure.



Square holes



Slots



Oval holes

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Write to nearest H & K office today—for General Catalog

THE Harrington & King PERFORATING CO. INC.

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Chicago 44, Illinois

118 Liberty Street
New York, New York

GOES OVER BIG for wheeling and dumping heavy materials

Specify Sterling No. 119
HEAVY-DUTY CART
Pneumatic-tired wheels or steel wheels

Here's a cart that's "tailor-made" for wheeling coal, scrap, chips, turnings, borings and similar heavy materials. All-steel, completely welded and reinforced. Made extra strong and rugged for heavy-duty service. Dumps easily. Rests securely in any one of the three positions shown here. Available with steel wheels or pneumatic-tired wheels . . . plain or roller bearings.

Write for Bulletin or see nearest dealer.

Some areas open for dealerships. Write . . .

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

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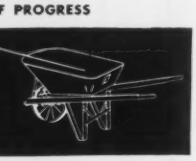
Sterling WHEELBARROWS

Look for this Mark of STERLING Quality



A 7846-½R

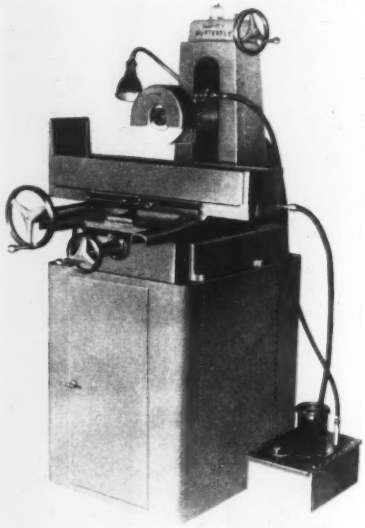
NEW PRODUCTS and equipment

stroke is 300 tons. Distance between the gibs is 137 in. Slide area is 90 by 136 in. The stroke is 18 in.

Almost 8 by 16 ft of floor area is required. Weight is approximately 192,000 lb. *Write*: Federal Machine & Welder Co., Warren, Ohio. *Phone*: 4252-1

Surface Grinder

This hand fed, precision surface grinder features a transverse slide which travels on double V-ways and has a capacity of 9 in. Needle bearings are used throughout and all ways are ground lapped and hand spotted.



Maximum capacity of the machine is 9 by 13 by 11½ in. *Write*: Harvey Mfg. Corp., 408 St. Paul St., Rochester 3, N. Y. *Phone*: Hamilton 6-6757

Milling Machine

This machine automatically mills pistons. It uses a built-in memory circuit which determines the depth of cut by weight readings. A tolerance of 0.02 lb is maintained. Hydraulic cylinders clamp the parts for milling, feed the spindle, and make the depth adjustments.

A two-speed 600 and 1800 rpm motor drives the spindle and a coolant system is provided for aluminum work.

NEW PRODUCTS and equipment

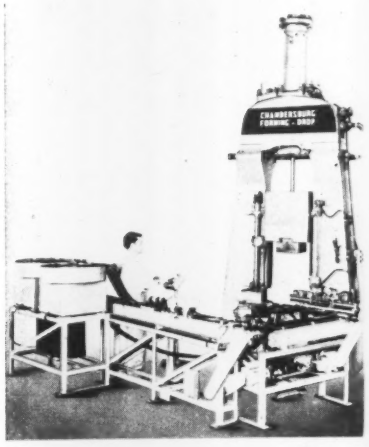
Production pieces per hour: For aluminum, 261; for cast iron, 192. *Write:* Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich. *Phone:* Lorain 7-0123

Diecasting

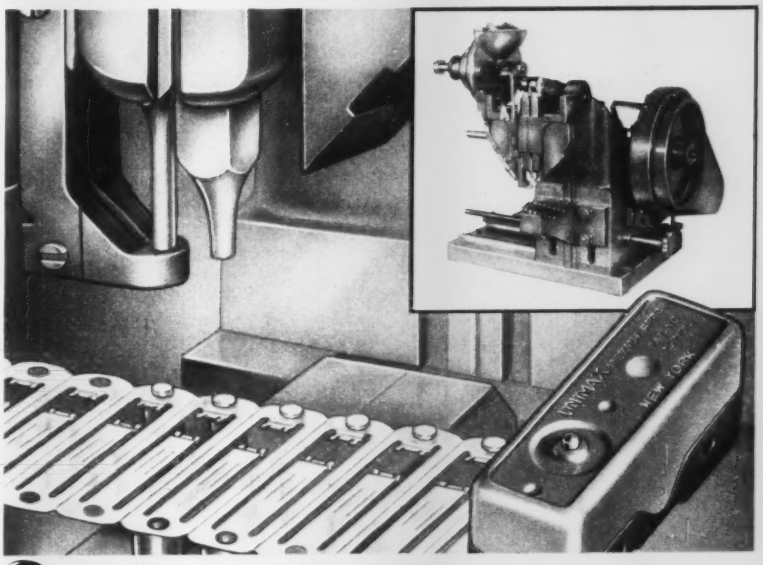
Alloy X385 will find use for integral bearing surfaces. It will withstand loads of 1500 psi. Tensile strength on a typical specimen is 36,000 psi; yield strength is 20,000. *Write:* Aluminum Co. of America, Room 731, Alcoa Bldg., Pittsburgh 19, Pa. *Phone:* Atlantic 1-4545

Drop Hammer

This electrically controlled, gravity drop hammer is designed for precision blow control and use of automatic feeding devices. It can be used for forming, embossing,



ELIMINATE PUNCH-PRESS—SAVE 50%



Tubular's DOUBLE-DRIVE RIVETER HELPS UNIMAX* ON SWITCH ASSEMBLY

50% Saved is 50% Earned

At Unimax, the problem of holding close tolerances in high-speed assembly of precision switches was solved by Tubular Rivet & Stud engineers. Previously, the silver contact was set on one machine and "coined"† on a punch-press. Because there can be no distortion of the spring element, and overall tolerances of the coined contact must be held to ± .001 inches, assembly was slow, and **Tubular** was brought into the picture.

The ingenious application of a **Tubular** 104-T double-drive machine eliminated the punch-press operation and made a 50% saving in time and assembly cost.

The double-drive machine performs as follows: The machine head with the hopper attached automatically feeds a contact into the jaws, guides it through the spring element and sets it on a spring pin anvil. During the next and subsequent cycles this operation is repeated. At the same time, the adjacent head is completing the operation on the set contact, coining it on the anvil at high speed while holding the specified tolerances.

* Unimax of Wallingford

Unimax Switch Division of The W. L. Maxson Corporation is located at Wallingford, Connecticut. Unimax precision snap-acting switches find wide use in modern control systems. Their current-handling ability and compactness simplify construction of complex electric controls and their availability in varied actuator styles gives the designer wide choice of operating means.

TUBULAR of Quincy

You may not be assembling switches but if your problem can be solved with riveting equipment, **Tubular** can do it. Call our nearest office or send us your blue print for complete information and technical help.

† "Coining" is the process of embossing designs, patterns or ridges on metal by completely trapping the blank between dies and applying pressure. (Coining definition from "The New American Machinists" Handbook 1955)

Tubular Rivet & STUD COMPANY
QUINCY 70, MASS.

FASTEN AUTOMATICALLY BETTER and FASTER with TUBULAR'S RIVETS and MACHINES

MIDWEST OFFICE & WAREHOUSE—CHICAGO

BRANCH OFFICES: ATLANTA • BUFFALO • CHARLOTTE • DALLAS • DETROIT INDIANAPOLIS • LOS ANGELES • NEW YORK CITY • PHILADELPHIA • ST. LOUIS • SEATTLE •

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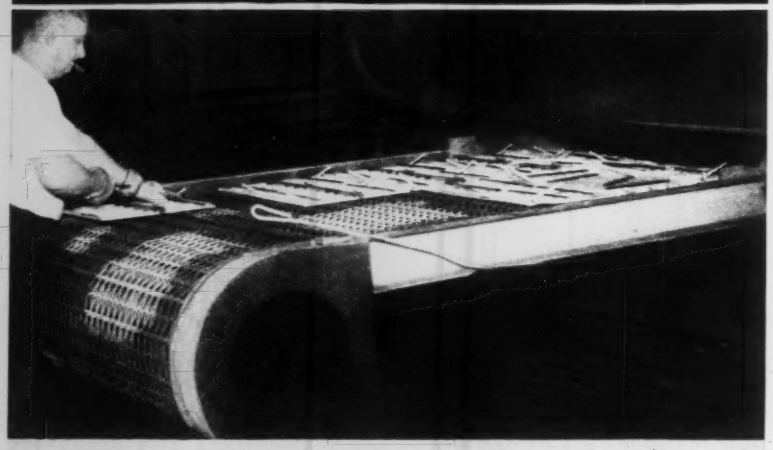
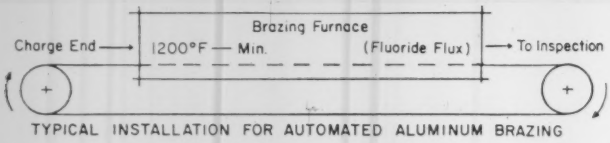
Cambridge WOVEN WIRE BELTS





TYPICAL INSTALLATION FOR AUTOMATED ALUMINUM BRAZING

METAL-MESH BELT CONTROLS PRODUCT UNIFORMITY IN CONTINUOUS BRAZING

Here's a belt that not only shrugs off hot atmospheres and corrosive fluxes, but helps produce uniformly brazed parts continuously —and in less time. Moving through the furnace at a controlled speed, the all-metal Cambridge Belt allows the atmosphere to circulate freely through its open mesh and around the product for fast, thorough treatment.

In heat treating, cleaning or quenching operations, too, Cambridge Belts help maintain capacity production and cut operating costs. Here's how:

CONTINUOUSLY MOVING BELTS ELIMINATE BATCH PROCESSING—give faster, more economical production; reduce manual handling.

ALL-METAL CONSTRUCTION IS HEATPROOF, COLDPROOF, ACIDPROOF—Cambridge belts can be woven from any metal or alloy to take sub-zero or up to 2100° F. temperatures, yet remain impervious to corrosive atmospheres or solutions.

OPEN MESH PROVIDES FREE AIR, LIQUID CIRCULATION—gives more uniform processing of product; grit, sand, quench solutions drain through belt immediately.

SPECIAL SURFACE ATTACHMENTS AVAILABLE—raised edges or cross flights hold product on belt during movement.

Talk to your Cambridge Field Engineer soon—he'll explain the many advantages of continuous heat treating on Cambridge Woven Wire Belts. He'll recommend the belt size, mesh or weave—and the metal or alloy—best suited to your operations. You'll find his name in the classified phone book under "BELTING, MECHANICAL." Or, write for FREE 130-PAGE REFERENCE MANUAL giving mesh specifications, design information and metallurgical data.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL-MESH CONVEYOR BELTS | WIRE CLOTH FABRICATIONS

Department J, Cambridge 3, Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

NEW PRODUCTS and equipment

coining, and restriking in a single die impression.

Air is used only when the hammer is in operation. Blow intensity adjustments are precise though simple. *Write*: Chambersburg Engineering Co., Chambersburg, Pa.

Water-Tube Boilers

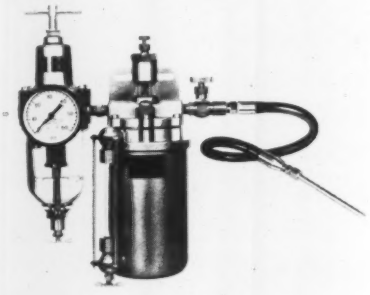
A complete package, the Thermodyne fits into one-third the normal space. Made of steel, it is designed for use outside or inside and can run on gas, oil, or electricity. Sizes range from 5 to 1000 hp.

Units are automatically controlled and designed for low or high pressure, low or high temperature. *Write*: Hercules Power Equipment Co., P. O. Box 49724, Barrington Station, Los Angeles 49, Calif. *Phone*: Empire 1-1561

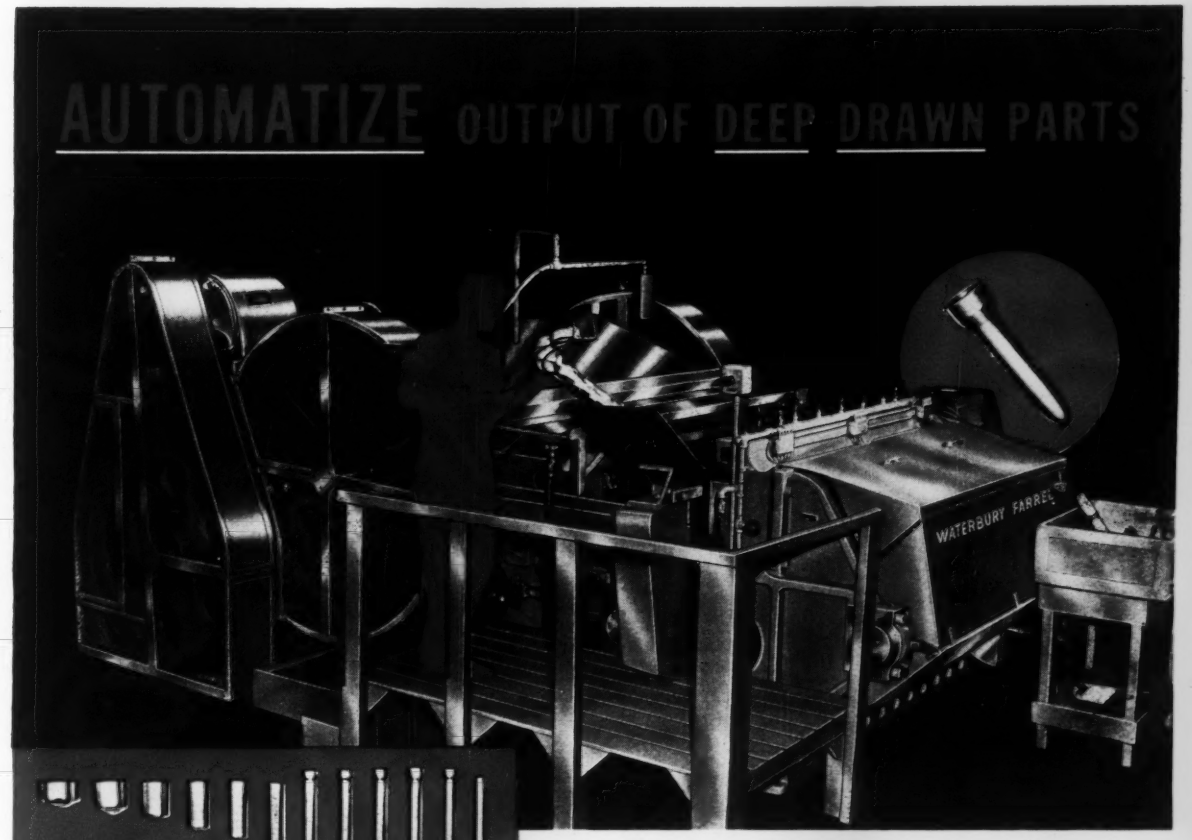
Spray-Lube

These units make compact installations for spraying cutting liquids for one or two tools.

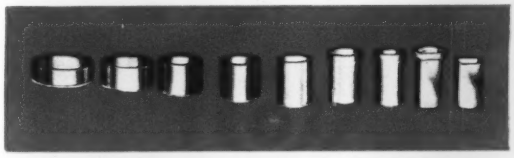
A filter-regulator unit controls



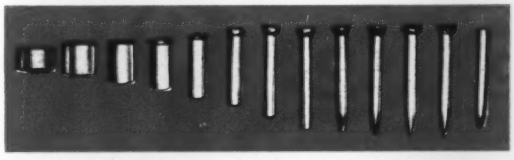
AUTOMATIZE OUTPUT OF DEEP DRAWN PARTS



Knife handle made from .047 thick German silver on a #7-11 station machine. Length of shell, 4⅜"; Dia., ⅜"; production, 2280 pieces per hour.



1 1/16" sq. x 2½" long condenser can be made from .018" thick zinc on a #5-9 station machine. Production, 3600 cans per hour.



Ball point pen holder made from .014" thick brass on a #4-12 station machine. Part measures ⅜" Dia. x 3¾" long. Production, 4200 parts per hour.

Use WATERBURY FARREL Horizontal Redraw Presses For Low Cost, Mass Production

Continuous, progressive drawing on these multiple station presses automatizes the production of square, round, elliptical, straight or shouldered, deep drawn shells. And, the machine will perform such consecutive operations as drawing, bottom piercing, curling, fluting, clipping and other work.

No longer is it necessary to form these shells on single purpose presses, in separate operations requiring intermediate annealing and handling. Work progresses smoothly, continuously and automatically through these Horizontal Redraw Presses.

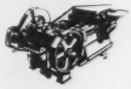
For automation in feeding material, Waterbury Farrel can supply (1) a cupping attachment for single machines to permit feeding strip stock, or, (2) a cupping press with gang tooling and a conveyor system for supplying cups to a bank of machines.

Write today for your free copy of CIRCULAR 926-M describing these machines and the wide range of sizes available.

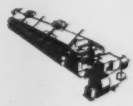
The WATERBURY FARREL FOUNDRY & MACHINE CO.
WATERBURY, CONN.
***SALES OFFICES:* Chicago • Cleveland • Millburn, N. J.**

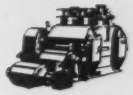
WF-36

Bolt, Nut & Screw Machinery


Power Presses

Rolling Mill Machinery


Wire Mill Equipment

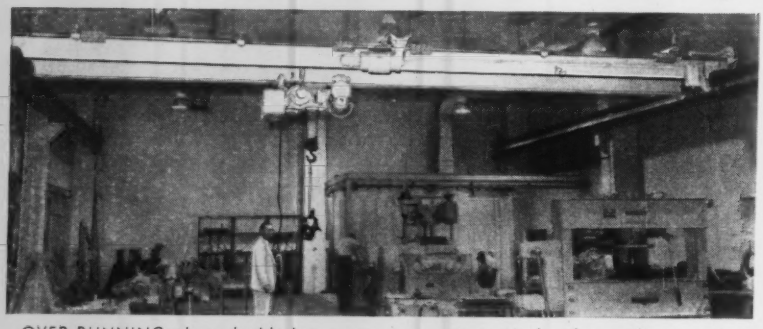

Sendzimir Mills and other Special Machinery

SHEPARD NILES

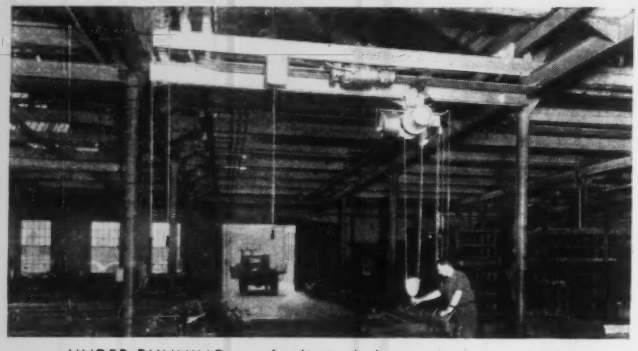
SINGLE BEAM CRANES

WHICH CRANE

. . . Over-running or Under-running?



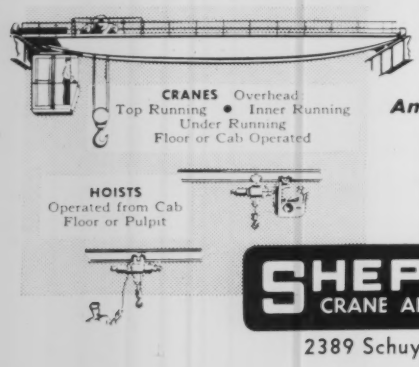
OVER-RUNNING where double beam cranes are not practical or for auxiliary service.



UNDER-RUNNING . . . for limited clearances . . . operating on runways hung from roof trusses!

Cut costly ground level handling. Move loads smoothly and safely overhead with Shepard Niles single beam cranes. Operate from floor or remote location. Push type or motor driven trolley type hoists, including close clearance units.

Send for Single Beam Crane bulletins today . . . or ask that a Shepard Niles representative call — there's NO OBLIGATION.



Building

America's Most Complete Line

of Cranes and Hoists

Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION

2389 Schuyler Ave., Montour Falls, N. Y.

pressure in air and liquid lines and removes damaging liquids and solids from the air stream. The liquid reservoir provides accurate control of liquid flow. *Write*: C. A. Norgren Co., 3400 S. Elati, Englewood, Colo. *Phone*: Sunset 1-5583

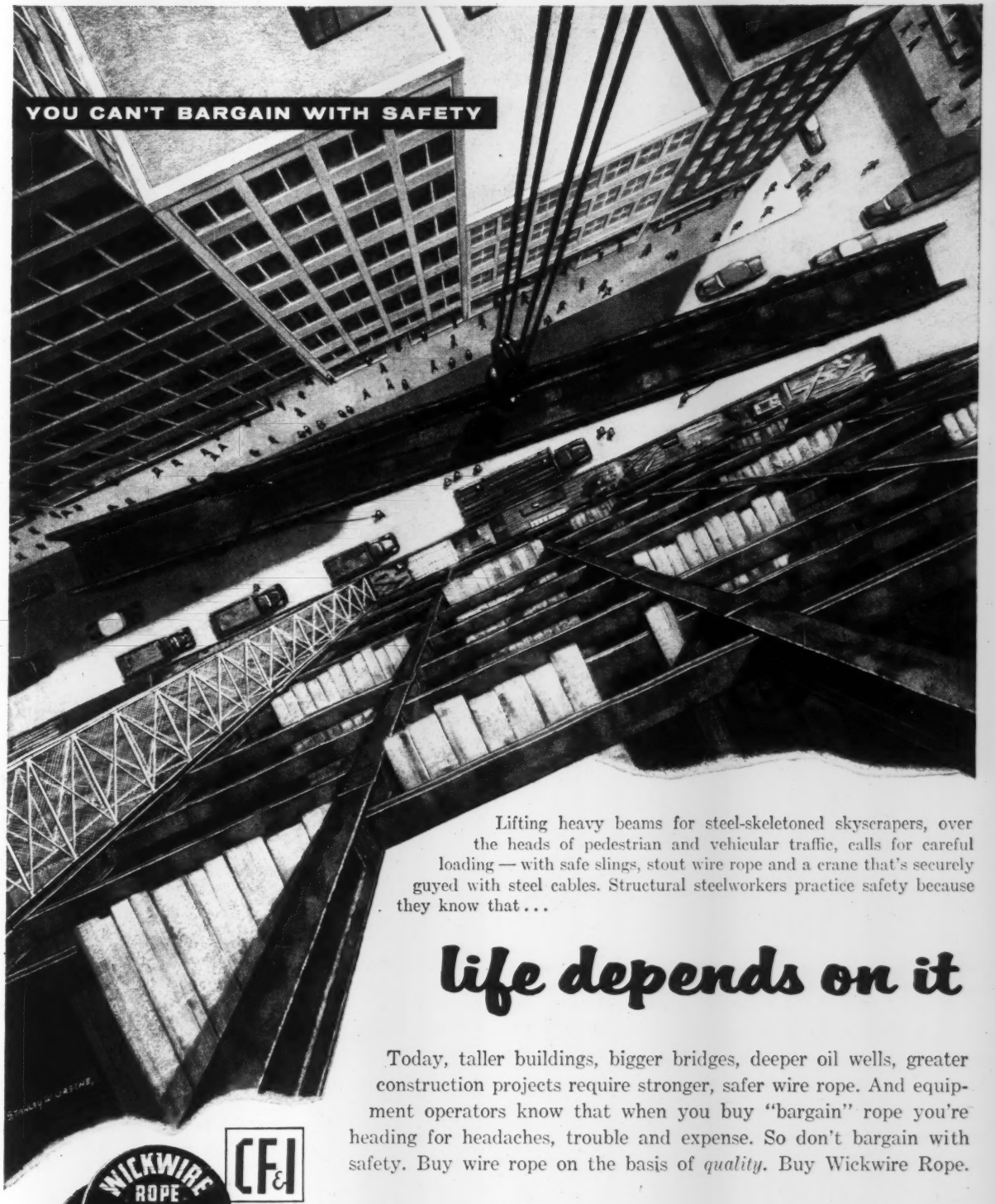
Ultrasonic Cleaner

Ultracleaner, Model 500A, is designed for the cleaning of small parts and assemblies. A second ultrasonic washing tank, to operate concurrently or separately, can be plugged in without additional equipment.

The unit is made of stainless steel, weighs 53 lb, and can accomodate parts up to 10 in. long. *Write*: Lawrence Mfg. Corp., Evans Terminal, North Broad St., Hillside, N. J. *Phone*: Elizabeth 3-4545

Magnetic Conveyor

Model 850 will convey lightweight metals at a 45-degree incline. The bed is an aluminum, formed box channel, and has two permanently



Lifting heavy beams for steel-skeletoned skyscrapers, over the heads of pedestrian and vehicular traffic, calls for careful loading — with safe slings, stout wire rope and a crane that's securely guyed with steel cables. Structural steelworkers practice safety because they know that...

life depends on it

Today, taller buildings, bigger bridges, deeper oil wells, greater construction projects require stronger, safer wire rope. And equipment operators know that when you buy "bargain" rope you're heading for headaches, trouble and expense. So don't bargain with safety. Buy wire rope on the basis of *quality*. Buy Wickwire Rope.

WICKWIRE ROPE — A CF&I PRODUCT

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LOOK FOR THE **YELLOW** *TRIANGLE*

5696

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
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CHANDLER

PRECISION CAP SCREWS MASS PRODUCED TO YOUR SPECIFICATIONS

Caught in the "profit squeeze" between rising costs and buyer-resistance, more and more manufacturers are turning to Chandler for cold-headed bolts mass-produced at realistic prices.

Chandler's step-by-step production control and rigid inspection standards assure accuracy, precision and uniformity to meet the most exacting specifications. Using high carbon, alloy, super-alloy and stainless steels, Chandler produces top-quality bolts with special heads or threads, drilled heads or shanks for the automotive, engine and aircraft industries.

Check with Chandler today for a quotation on your special bolt requirements.

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1488 Chardon Road • Cleveland 17, Ohio

Write today for Bulletin 1264-Ch

7914-CH

NEW PRODUCTS and equipment

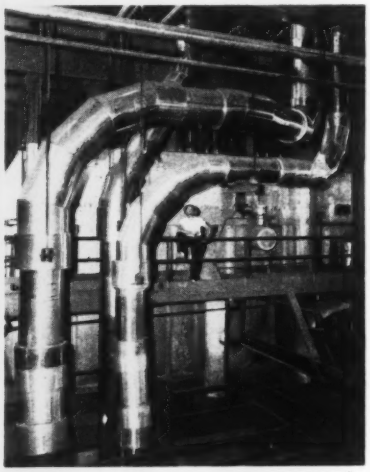
energized magnets which maintain an even field.

Conveyor and power train are mounted on tubular framing with two wheels for easy moving. *Write*: Rapids-Standard Co. Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

Mirror Insulation

This thermal insulation is an all-metal reflective type. Utilizing the principle of the thermos bottle, it can handle temperatures from —400 to 2000° F.

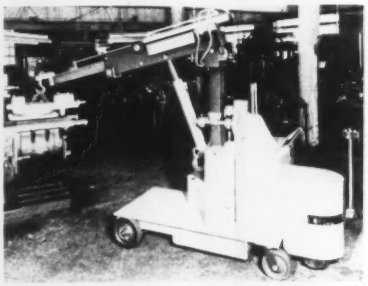
It is offered in prefabricated units for pipes, fittings, boiler casings, ducts, and custom installations.

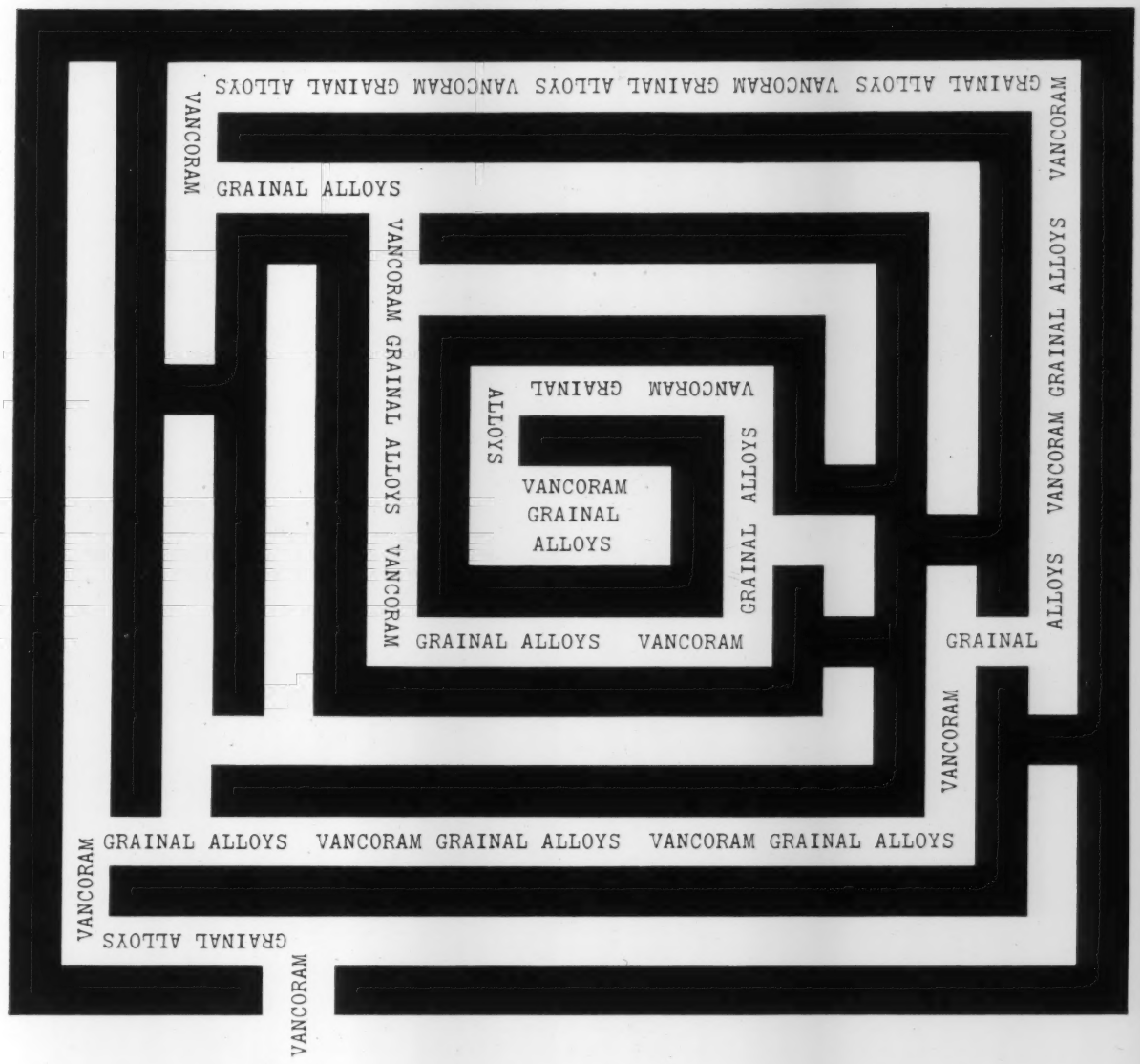


Standard forms are held in place by stainless steel bands. A snap-latch type is available. *Write*: Mirror Insulation Co. Inc., 201 S. Main St., Lambertville, N. J. *Phone*: Export 7-1396

Boom Truck

Hydro-Boom's capacity at maximum boom extension is 1500 lb. When fully retracted, it is 2500 lb. The operator, by telescopic action,





EASIEST SOLUTION TO MANY PROBLEMS! Grainal was first introduced in 1938 as a hardenability intensifier. Since then it has been used in millions of tons of steel.

In recent years, Grainal Alloys have become increasingly important in stainless and heat-resisting steels where they improve hot-working characteristics and reduce conditioning costs and rejections.

Grainal Alloys improve the physical properties of high-strength cast steels. They are also used in cast steels as a special deoxidizer.

Call your nearest VCA office to learn more about these *versatile* alloys . . . or write for the informative pamphlet — "Grainal and Its Use." Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y.

Producers of alloys, metals and chemicals

VANADIUM CORPORATION OF AMERICA

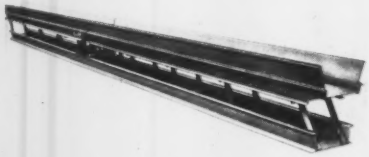
NEW PRODUCTS and equipment

can position workloads within 0.01 in. vertically, longitudinally or cross-wise to the direction of travel. Vertical and longitudinal travel are operated hydraulically.

The hook reaches up to 4 ft beyond the truck front and over obstacles to deposit or pick up work. *Write*: Vanguard Engineering Co., 1908 E. 66th St., Cleveland 3, Ohio. *Phone*: Henderson 2-0755

Shaker Conveyor

This unit conveys bulk materials at high speed. It can be used to dry, preheat, or cool in transit, or to scalp, size or de-water while conveying.

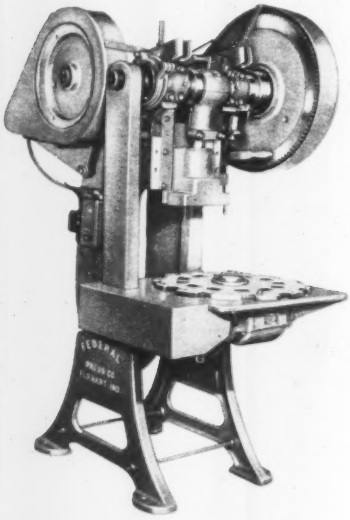


The unit has two equal length sections, approximately 50 ft long. *Write*: Syntron Co., 370 Lexington Ave., Homer City, Pa. *Phone*: 9-8011

Dial-Feed Press

The index cam of this press is driven by a center-guided timing chain which is covered for safety. This feature allows more work area for the operator.

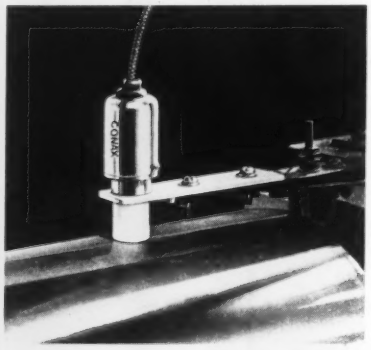
The dial feed index rollers are cam followers, sealed for lifetime



lubrication. The index and work plates operate on ball thrust bearings. Capacities range from 6 to 80 tons. *Write*: Federal Press Co., Elkhart, Ind. *Phone*: 2-5115

Thermocouple

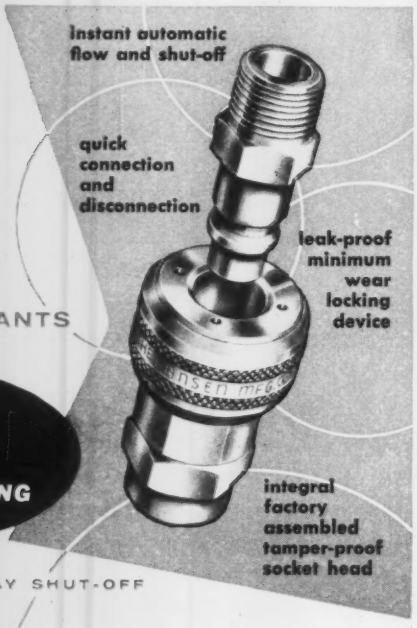
These thermocouples measure and control the surface temperature of rotating rolls, shafts, or bearings. They are easily installed and the temperature reading is unaffected

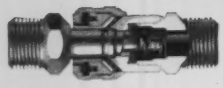


Thoroughly Proved...

BY YEARS OF HARD EVERYDAY USE IN THOUSANDS OF PLANTS

HANSEN
QUICK-CONNECTIVE
PUSH-TITE COUPLING


Instant automatic flow and shut-off
quick connection and disconnection
leak-proof minimum wear locking device
integral factory assembled tamper-proof socket head



ONE-WAY SHUT-OFF

Locking pins in Hansen Push-Tite Coupling Socket afford large area contact with Plug, thereby preventing wear and subsequent leakage.

The ability of Hansen Push-Tite Couplings to withstand severe service—with practically no maintenance—has been thoroughly proved by years of hard, everyday use in thousands of plants. The "socket head", which contains the locking device, is factory assembled into a rugged integral unit which cannot be readily injured or have component parts lost by casual tampering.

To connect the Coupling, you merely push the Plug into the Socket with one hand. Flow is instantaneous. To disconnect, push back sleeve on Socket—Coupling disconnects. Flow is shut off instantly and automatically.

QUICK-CONNECTIVE FLUID LINE COUPLINGS for
AIR • OIL • GREASE
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Here's an always ready reference when you want information on couplings in a hurry. Lists complete range of sizes and types of Hansen Quick-Connective Couplings. Write for your copy.

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QUICK-CONNECTIVE FLUID LINE COUPLINGS

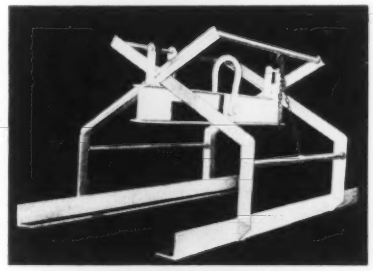
THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO

by changes in roll velocity. *Write*: Conax Corp., 2300 Walden Ave., Buffalo 25, N. Y. Phone: Regent 0600

Tongs

Sheet steel packs from 18 to 42 in. wide and up to 16 in. deep can be handled by these units. They come in 5 to 9 ft lengths with capacities from 2 to 5 tons.



They're useful where lifting is limited and an inexpensive lifter is adequate. *Write*: Materials Handling Div., Heppenstall Co., New Brighton, Pa.

Induction Generator

Model L7F is designed for heavy duty industrial use. It operates with a wide range of work coils and loads and can be set up for automatic operation. Continuous power adjustment from 1 to 5 kw is featured. It is water cooled and has a water economizer valve.

Built-in safety devices provide overload protection for all circuits. *Write*: Reeve Electronics Inc., 609 W. Lake St., Chicago 6, Ill. *Phone*: Randolph 6-9755

Shell Cores, Molds

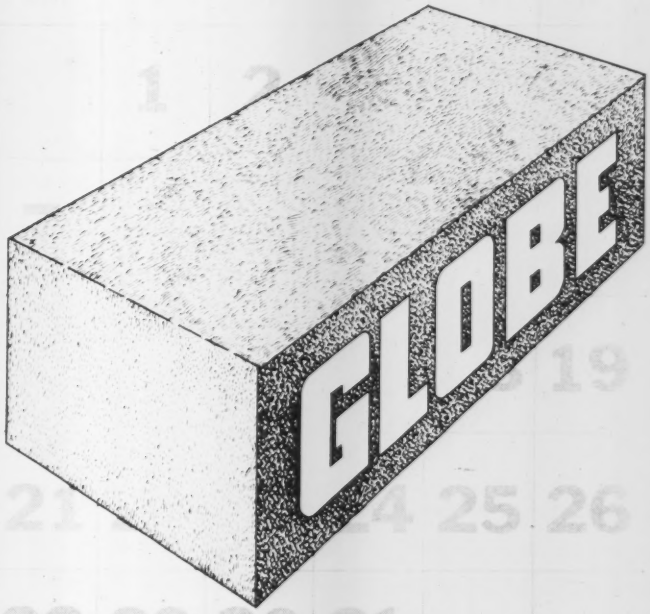
A two station, automatic machine produces shells or sets of shells. Operating rate: Up to 90 cycles an hour. Cores or molds are fully cured and ready for the molding line.

This machine is available in two sizes; SP-1500 (maximum pattern size, 36 by 27 by 10 in.) and SP-1550 (maximum pattern size, 26 by 20 by 10 in.) *Write*: Sutter Products Co., 407 Hadley St., Holly, Mich. *Phone*: Melrose 7-7241

Spraymist Coolant

This coolant unit is designed as a complete package. Air filter, trap, regulator and gage, solenoid valve and conduit box, and pressurized coolant reservoir and filter are provided.

A range from superfine mist to

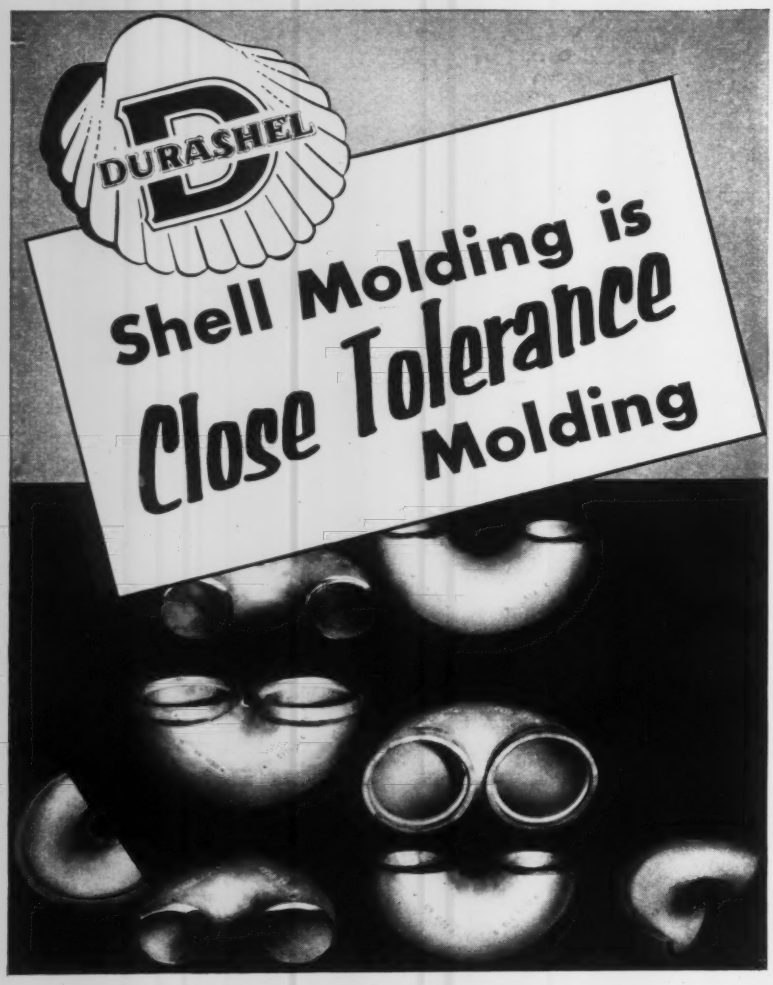


GLOBE SUPERIOR LADLE BRICK LASTS LONGER

SERVING THE STEEL INDUSTRY SINCE 1873

There's no secret involved in their manufacture. Wire cut or dry pressed, they are simply quality products made from quality materials. Because they are better than average brick, they last longer. Because they last longer, they save much time lost in refractory replacement. That's why they are a good investment.

The GLOBE BRICK Co.
EAST LIVERPOOL, OHIO



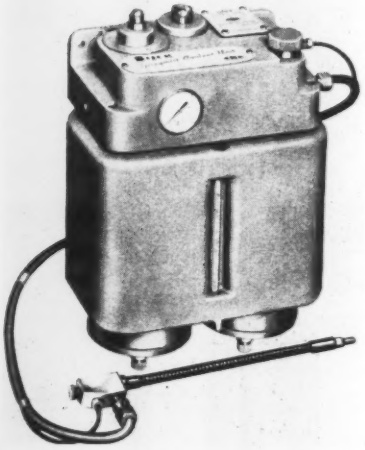
These are Duraloy Shell Molded 180° Bends. And incidentally, several different alloying combinations of chrome iron and nickel are represented in these bends.

One of the outstanding values in shell molded castings is the higher precision or close tolerance casting . . . also usually less machining and finishing . . . than when pieces are cast statically. For quantity production it is usually more economical.

We suggest that you investigate shell molding for your high alloy casting requirements. It has much to offer and we have complete facilities for taking care of your requirements. Should other casting methods—static or centrifugal be better, we have these facilities, too.

The DURALOY Company
OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

NEW PRODUCTS and equipment



heavy spray is possible. *Write*: Bijur Lubricating Corp., 151 W. Passaic St., Rochelle Park, N. J. *Phone*: Diamond 2-8850

Copper Plating

An addition agent for copper plating (CU-521) acts as a grain refiner in producing dense copper deposits.

It can be plated at current densities up to 50 amperes per sq ft without roughness or burning. It's used in both barrel and rack operations. *Write*: Wagner Bros. Inc., 400 Midland, Detroit, Mich. *Phone*: Tulsa 3-0100

Bin-Rack Truck

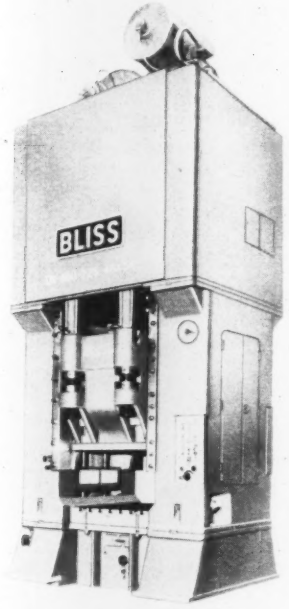
Flexibility in handling or storage, and fast mobility of parts are features of this new Stackrack hand truck. The Stackracks lock securely to the truck without tools or fasteners, and bins are easily removed.

This truck is welded, heavy gage

formed steel, easy to pull, and has two swivel casters on the front. *Write*: Stackbin Corp., 1123 Main St., Pawtucket, R. I.

Press

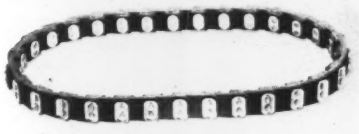
This line of straight side, one point, double action enclosed toggle presses has capacities from 200 to 2000 tons. Piping, electrical controls, main panel, limit, and automation switches are enclosed in the uprights.



A recirculating oil system lubricates gears and bearings. Grease is automatically applied to all ways and blankholder wrist seats. *Write*: E. W. Bliss Co., Canton Ohio. *Phone*: 7-3421

Drive Belts

This belt can be adjusted to any length, and is installed without dismantling of machinery. It is made



of oil and heat-resistant neoprene. *Write*: Manheim Mfg. & Belting Co., Manheim, Pa.

NOW!
THE HIGH TEMPERATURE CHROME PLATING ADDITIVE
with DUAL ACTION *
New ZERO-MIST H.T.-2
* IT STOPS MIST AND SPRAY COMPLETELY
* IT LOWERS SURFACE TENSION

You save money TWO ways with new Zero-Mist H.T.-2! Its DUAL-ACTION absolutely suppresses mist and spray in decorative chrome plating baths of *any type* and at the same time lowers the surface tension. You don't have excessive dragout—You don't lose solution in the air—You don't contaminate other plating solutions—You simplify your ventilation problems . . . and, Zero-Mist H.T.-2 maintains its efficiency at any operating temperature.

New Zero-Mist H.T.-2 is extremely economical too! Its DUAL-ACTION means faster make-up . . . and less maintenance and, it's stable forever, whether the solution is in use or standing idle.

For the economical, complete suppression of mist and spray in your decorative chrome plating baths . . . with the biggest savings in chromic acid solution, see your local Udylite representative today and start using New DUAL-ACTION Zero-Mist H.T.-2 right away.

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NEW literature

Write directly to the company for a copy

Welding Electrodes

The 12-page Weldirectory is designed to help you pick the proper electrode. Lincoln Electric Co., Cleveland 17, Ohio.

Zinc-Base Alloys

A reference book and guide on Zamak zinc-base alloys gives composition, properties, constants, and specifications. Henning Bros. & Smith Inc., 91-127 Scott Ave., Brooklyn, N. Y.

Magnesium Alloys

The properties, uses, and advantages of magnesium alloys and products are given in this booklet. White Metal Rolling & Stamping Corp., 88 Moultrie St., Brooklyn 22, N. Y.

Cylinder Actuators

Bulletin B-50-3, 12 pages, describes the operation of the cylinder Conomotor. Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.

Fastener Tools

Form 8-420 describes a line of hydraulic pull tools for fastener installation. Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Mich.

5,106,250 LABORATORY DETERMINATIONS AND STILL GOING STRONG!

A LARGE METALS PRODUCER REPORTS ON THE **BAIRD-ATOMIC** DIRECT READING SPECTROMETER:

"During the past *10 years* we have used the Baird-Atomic Direct Reader for spectrochemical analysis making 5,106,250 determinations in 377,350 tests controlling 70,920 heats.

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Baird Atomic

Instrumentation for Better Analysis

Photoelectric Units

This 24-page brochure covers normal, high speed, sensitive, and impulse actuated controls. Autotron Inc., Box 722 U, Danville, Ill.

Metal Shapes

Handbook MS 158, 48 pages, illustrates the basic principles of roller die, cold forming metal shapes. Van Huffel Tube Corp., Warren, Ohio.

Air Chuck Catalog

This catalog lists air-operated chucks, cylinders, and accessory equipment. Cushman Chuck Co., Hartford, Conn.

Tape Controlled Machines

This bulletin describes the new Burgmaster Electropoint tape controlled drilling, tapping, and boring machines. It explains how to mark up prints, program a part, punch the tape, and put the work on a machine. Burg Tool Mfg. Co. Inc., 15001 S. Figueroa St., Gardena, Calif.

Conveyor Manual

Handbook 909 covers material handling by belt conveyors. Technical data, terminal dimensions, and conveyor selection tables are given. Jeffrey Mfg. Co., Columbus 16, Ohio.

Protective Coatings

This 36-page treatise, No. 257, features color chips of 102 coating items and includes complete sections on surface preparation, use of primers, and finish coatings. Rust-Oleum Corp., 2799 Oakton St., Evanston, Ill.

Price List

This bulletin covers more than 7000 steel fasteners which this company carries in stock. Star Stainless Screw Co., 655 Union Blvd., Paterson 2, N. J.

Electric Hoists

Bulletin E-58 describes a line of electric hoists. It covers six types with capacities from ½ to 10 tons. Wright Hoist Div., American Chain & Cable Co. Inc., York, Pa.

Gaging Booklet

Gaging practices involving plain and thread plug, and ring gages are discussed in the Gage Primer. Tolerances, policies, and pricing are covered. Rite-O Tool & Gage Co., 321 W. Ten Mile Rd., Hazel Park, Mich.

Tooling Catalog

Catalog B-305 details 42 styles and 220 different holders for throwaway carbide inserts. Kennametal Inc., Latrobe, Pa.

Gear Catalog

Catalog 80, 180 pages, covers a line of speed reducers, and custom and commercial gears. Grant Gear Works, Inc., 154 W. Second St., Boston 27, Mass.

NEW LITERATURE . . .

Heavy-Duty Lathes

Bulletin 1216 describes Betts heavy-duty, geared head lathes in sizes from 48 to 144 in. and larger. Consolidated Machine Tool Div., Farrel-Birmingham Co. Inc., 565 Blossom Rd., Rochester 10, N. Y.

Coatings and Linings

Information is given on corrosion protection offered by coatings and linings of baked aluminum, stone, and phenolic and epoxy resins. Lithcote Corp., 5000 W. Lake St., Melrose Park, Ill.

Barrel Processing Compounds

"Permag Compounds for Barrel Processing" is a manual prepared for shopmen, engineers, and purchasing agents (for comparisons). Numerous case histories are given, in addition to general information and process information (on 11 topics). Magnuson Products Corp., 50 Court St., Brooklyn 1, N. Y.

Mill Motor

Design features of a Crocker-Wheeler 620 frame motor are described in Bulletin PB-9000-2, 4 pages. Elliott Co., Jeannette, Pa.

Soldering Irons

Bulletin GED-3553, 8 pages, describes a complete line of soldering irons. Case histories of their use are included. General Electric Co., Schenectady 5, N. Y.

Heat Exchangers

Bulletin 1.1K6, 8 pages, gives details of 46 sizes in one, two, and four pass designs. Heat transfer surfaces range from 1.2 to 124 sq ft. Ross Heat Exchanger Div., American Radiator & Standard Sanitary Corp., Buffalo 5, N. Y.

Floor Surfacing

Test data and typical installation of Monile are illustrated in this booklet. It is designed to resist heavy truck traffic, process solutions and temperature changes. Master Mechanics Co., 2097 Columbus Rd., Cleveland, Ohio.

Manufacturers' Catalog

Items from abraders to viscosimeters are covered. Among those illustrated are cabinets, meters, computers, gages, tools, recorders, testers, machines, and safety equipment. Gardner Laboratory Inc., 5521 Landy Lane, P. O. Box 5728, Bethesda 14, Md.

NEW BOOKS

Qualitative Testing and Inorganic Chemistry, Joseph Nordmann, John Wiley & Sons Inc., 440 Fourth Ave., New York 16, N. Y. 488 pages, $6.25.
This volume combines lecture and laboratory approaches. Qualitative analysis and general chemistry are covered. Included are sections on blow pipe analysis, dry fusions, bead and flame tests.

Reynolds Aluminum Air Duct Guide, Reynolds Metals Co., P. O. Box 1800-A, Louisville, Ky. 130 pages, no charge.
This manual contains over 350 illustrations covering the advantages of aluminum air ducts. It contains details on engineering, drafting, estimating, fabricating, and installation. Residential, commercial, and industrial applications are included.

Designing Parts for Cold and Hot Heading, Industrial Fasteners Institute, 1517 Terminal Tower, Cleveland 13, Ohio. 95 pages, $2.
This manual is strong on cost saving and special applications in the fastener and related product fields. It contains data on fundamentals, design, materials, processing, and the dimensional effects of electroplating.

Product Standards for Die Castings, American Die Casting Institute Inc., 366 Madison Ave., New York 17, N. Y. 40 pages, $5.
Three series of standards are covered: Engineering, metallurgical (physical properties and constants), and commercial (purchasing contracts). Purchasers will be furnished with subsequent standards (at no cost) to insert in ring binders.

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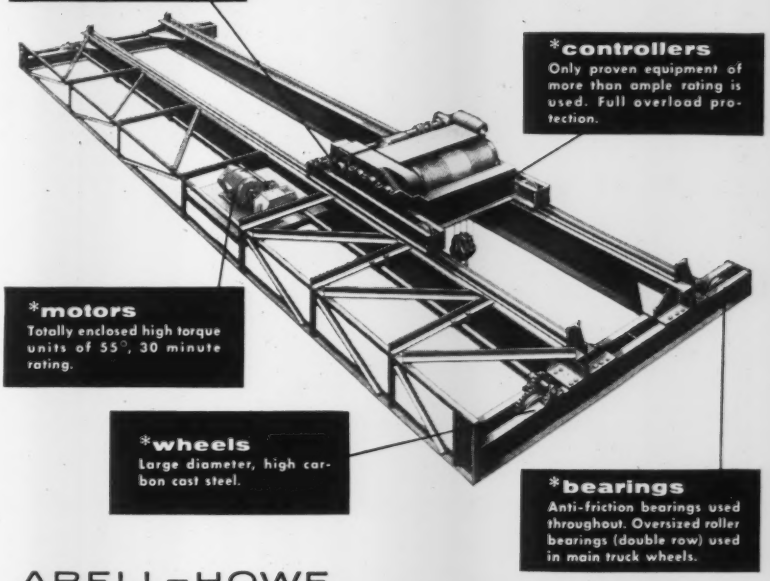
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*In any crane, these are the parts that handle the heavy work . . . the parts that *must be* top quality if you're looking for crane *dependability*. Compare Cranemaster engineering at these critical points with any industrial shop crane. Then compare prices. Time and time again Abell-Howe proves it has the top value in overhead traveling cranes . . . in capacities to 20 tons—spans to 60 feet.

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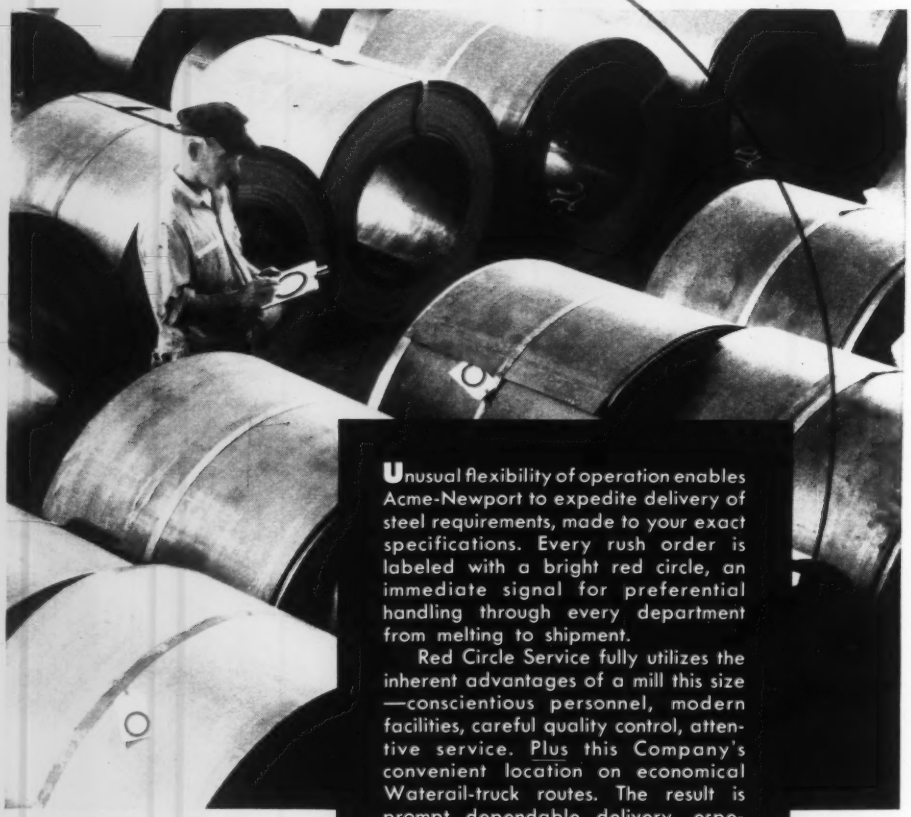

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ELECTRICAL SHEETS
ELECTRIC WELD LINE PIPE

Acme-Newport Steel COMPANY
NEWPORT, KENTUCKY
A SUBSIDIARY OF ACME STEEL COMPANY

STEEL
March 3, 1958

Market Outlook

LOOK for production of about 95 million tons of steel for ingots and castings this year. That's the industry's current estimate. In December, steelmakers were hoping 1958 output would reach 111 million tons.

LOOKING AHEAD— With a slight pickup in March, they'll produce 19 million tons during the first quarter. Here's how one sales manager thinks the rest of the year may go: Second quarter business should be better than the first quarter's because of seasonal improvements and a slowdown in inventory reduction. (Stocks have been cut 1 million tons a month since last October.) Prospects for a pickup are somewhat clouded because of the likelihood of less-than-usual demand from automakers, structural fabricators, and oil producers. Third quarter business will probably dip below the second quarter level, but given enough momentum from a spring recovery, it could surpass the first quarter performance. By all odds, fourth quarter production should be the year's best.

MARCH UPTURN?— During the week ended Mar. 2, steel production edged upward. Furnaces were operated at 53.5 per cent of capacity, 1 point above the previous week's rate. Output was 1,444,000 net tons of steel for ingots and castings, compared with 2,456,000 tons a year ago. After a week of severe weather, improvement was to be expected, so the upturn has little significance.

INGOTS ACCUMULATE— A better indication of how things stand is seen in the report that a Buffalo area mill is still piling ingots in its yard. Even at its reduced rate of production, it's running ahead of orders.

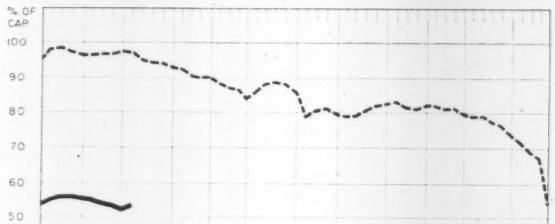
INVENTORIES STRETCH— Production cutbacks are stretching out automakers' steel inventories to 22-26 days in some cases, although the aim is still to keep them at a 12 to 15 day level. General Motors Corp. moved its February orders for sheets back to March and will probably limit March buying to the canceled February tonnage. Instead of placing monthly orders, GM is buying for two-week periods—a practice which makes scheduling difficult for producers.

UPS AND DOWNS— International Harvester Co. will close its plants at Indianapolis, Ft. Wayne, Ind., and Springfield, Ohio, for a week starting Mar. 10. All make truck parts or engines. The full shutdown was decided upon after the union rejected a four-day workweek. As if to balance the move, Caterpillar Tractor Co. will return to a five-day week in March at four plants: Peoria and Joliet, Ill., Milwaukee, and San Leandro, Calif. They've been working four days since Jan. 13.

TUBULAR OUTLOOK— Major oil firms indicate they'll be buying in May and June for third quarter delivery. For the year as a whole, the outlook is none too bright. The oil industry estimates well drilling will be off 15 per cent this year from 1957. Sales to drilling firms are currently down about 70 per cent because of excessive tubing and casing inventories.

STAINLESS BRIGHTENS— Inquiries for future delivery of stainless have picked up noticeably, a Pittsburgh producer reports. Plates are moving in substantial volume to manufacturers of industrial equipment and the atomic energy industries. Automakers' orders for strip are spotty.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

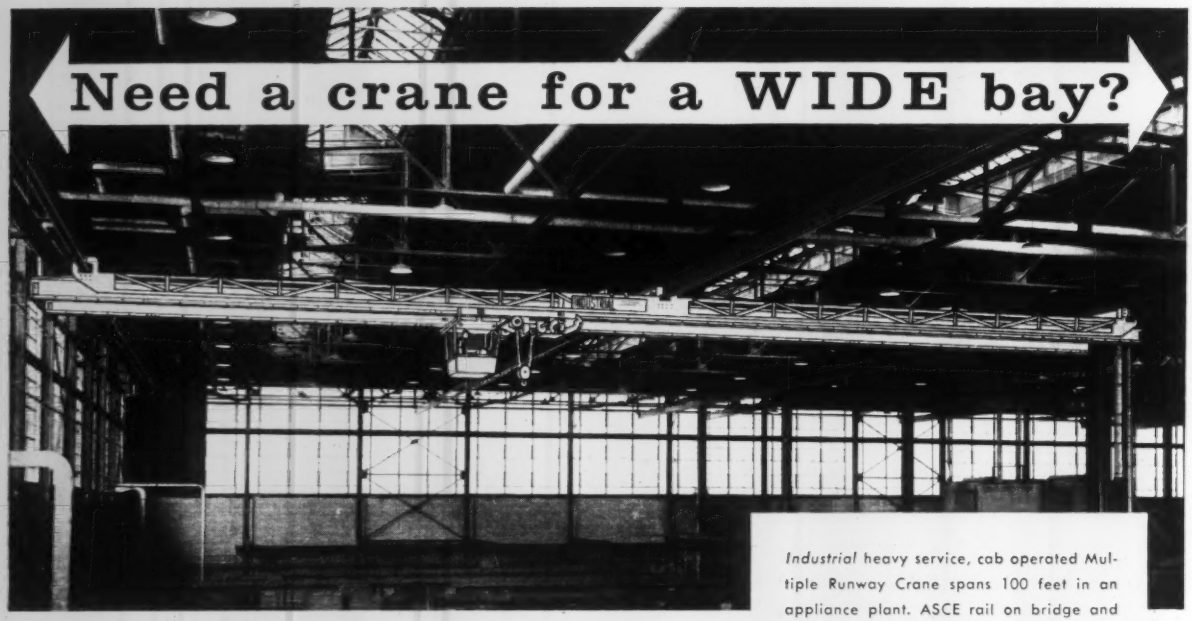
	Week Ended Mar. 2	Change	Same Week 1957	Same Week 1956
Pittsburgh	56.5	+ 0.5*	98	102
Chicago	60	+ 0.5*	96	99.5
Mid-Atlantic	67	— 1*	99.5	100
Youngstown	55	+ 1	98	97
Wheeling	59	+ 1	101	97
Cleveland	34	+ 4*	96.5	100.5
Buffalo	39	— 5	100	105
Birmingham	51.5	+ 4.5*	98	95
New England	52	0	68	75
Cincinnati	51.5	+ 1.5*	93	97.5
St. Louis	82.5	+ 2.5	93.5	106
Detroit	51.5	+ 0.5*	102.5	97
Western	68	+ 5	105	108
National Rate	53.5	+ 1	97	98.5

INGOT PRODUCTION‡

	Week Ended Mar. 2	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	91.4†	85.5	90.8	152.9
NET TONS (In thousands)	1,468†	1,373	1,459	2,456

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,699,173 in 1958; 2,559,490 in 1957; 2,461,893 in 1956.

Metalworking Outlook—Page 47 Technical Outlook—Page 93



Industrial heavy service, cab operated Multiple Runway Crane spans 100 feet in an appliance plant. ASCE rail on bridge and runways for high speed and heavy service.

Industrial

Multiple runway cranes provide crane coverage over widest bays

If you are planning an extra wide shop bay requiring overhead crane service and still want to keep floor areas clear of supporting pillars, *Industrial's* Multiple Runway Crane will fill the bill. Multiple runways allow minimum depth and weight of crane bridge and eliminate intermediate supporting pillars even on extremely long spans. This member of the versatile *Industrial* crane family is ideal for warehouse or similar application where wide, unobstructed floor space is at a premium.

Trouble-free service is built into *Industrial* Multiple Runway Cranes with engineering features proved superior in *Industrial* standard high quality underhung cranes:

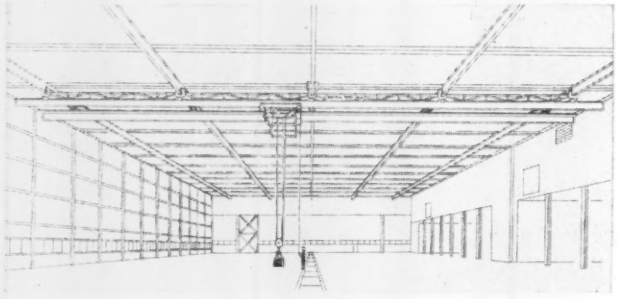
- Forged steel heat treated wheels.*
- Patented removable axles.
- Flexible couplings throughout.
- Gear drive enclosed in oil bath.
- Jig-assembled and jig-bored end trucks with large gusset plates for perfect alignment.
- Precision ball and roller bearings.
- Channel or truss type outrigger standard equipment for extra support.

*All driver wheels are heat treated for extra wear.

Industrial Heavy Service Underhung Track Section.

This heavy service *Industrial* track combines the durability of a high carbon manganese running surface with the safety of a ductile structural I-beam load-bearing member.

One of three *Industrial* floor operated, 15 ton Multiple Runway Cranes installed in an aircraft factory. Cranes span 130 feet.



To obtain fullest economy from *Industrial's* Multiple Runway Crane in new or existing buildings consult with *Industrial* engineers. *Industrial* makes many other types of overhead and jib cranes and can recommend the type and size that will best fill your needs. Send for Catalogs.

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1550 S. PAULINA STREET, CHICAGO 8, ILLINOIS

Export Sales: Borg-Warner International, 36 South Wabash Ave., Chicago 3, Illinois

Market for Porcelain Enamel on Aluminum... As in These Signs:

1957 MARKET
(In sq ft)

Building materials	3,800,000
Signs	250,000
Appliances	200,000
Transportation	200,000
Utensils	300,000
Military & other	450,000
TOTAL	5.2 million

1961 MARKET FORECAST
(In sq ft)

Building materials	15,000,000
Signs	2,600,000
Appliances, household equip.	2,000,000
Transportation	600,000
Utensils	1,100,000
Military & other	1,500,000
Sanitary	200,000
TOTAL	23 million

Estimates of Porcelain Enamel Institute Inc.

Coated Aluminum Use Rises

"BUILDERS want the impact of color and the weight of aluminum," is the way an enameler explains strengthening demand for porcelainized aluminum—despite slowness in some fields of construction.

The Porcelain Enamel Institute Inc., Washington, predicts that shipments will soar from an estimated 5.2 million sq ft in 1957 to 23 million in 1961. The building industry will continue to be the leading consumer, but PEI expects "significant penetration" of the sign, appliance, and utensil industries and the development of new automotive and sanitary applications.

Usage Mounts—Enamelers used 3.7 million lb of aluminum in 1956 and an estimated 5.5 million lb in 1957, PEI reports. The outlook for 1961 is 21.5 million lb. Such growth is attracting new fabricators. Erie Enameling Co., Erie, Pa., a steel enameler for 35 years, is completing a pilot plant for aluminum enameling.

Several steel coating specialists are eying the light metal with misgivings. They say enameling aluminum requires closer control of temperatures. Advocates point out that aluminum requires a lighter coat, is lighter, and won't rust when chipped.

Industry Members — PEI lists eight producers of porcelain enamel frit for aluminum and 23 firms which have facilities for enameling the metal. Over 70 per cent of their 1957 production was used in building. The rest went into signs, appliances, transportation equipment, utensils, and military applications.

Here's how some industry members view leading applications: "Porcelain - enameled aluminum combines color with permanent protection," reports H. H. Robertson Co., Pittsburgh.

"Principal architectural uses are in spandrels, mullions, and building facades," adds M. Jesse Salton, president, Seaporcel Metals Inc., Long Island City, N. Y. "Other uses are signs and directional indicators on roadways."

Ingram-Richardson Mfg. Co., Beaver Falls, Pa., stresses enameled aluminum's durable, uniform color and lightness as leading factors in the rise of architectural applications. J. Fred Ingram, president, says: "A great many more inquiries are being received on potential jobs involving porcelain enamel on aluminum."

New, Growing Uses—Aluminum Co. of America, Pittsburgh, expects to sell enameled cast aluminum lavatory sinks and bathtubs within two years.

Alcoa also looks for "certain gains" in architectural uses of enameled sheets.

Monarch Aluminum Mfg. Co., Cleveland, makes porcelainized permanent mold castings for producers of cooking utensils and electrical appliances.

Three-Year Trend—PEI believes

that architectural applications will make up 65 per cent of the market in 1961. The government's highway program is expected to increase sign construction from today's 5 per cent of the market to 11 per cent by 1961. Appliances and household equipment industries, which took 4 per cent in 1957, will grab an estimated 9 per cent in 1961.

Problems typical of a new industry continue to block complete acceptance. "The product has not yet come of age," one fabricator says. "In its early years, product quality was sometimes disappointing. Now frits are improved, as are methods of applying the frit. The industry has a long way to go to meet its 1961 goals, but progress in the last three years has been encouraging."

Wire . . .

Wire Prices, Pages 155 & 156

March wire orders are heavier, but buying is largely on a day-to-day basis. Delivery is a dominant factor in the placing of orders because consumers' inventories are down.

Heading wire volume is slightly larger in New England. Rod buying reflects depressed consumer operations. Despite cuts and postponents in auto orders, over-all volume is fair; demand from other consumers is holding at fair levels in some market areas. At St. Louis, for example, February volume was within 10 per cent of January's.

Compared with other finished steel products, supply-demand has been in balance for wire more than a year. Since late 1956, wire products have been moving sluggishly; and no significant change in buying is in sight.

NEW STAR in the MILLER
GOLD STAR LINE

The revolutionary dc welding performance achieved by the new Miller Gold Star transformer, completely sealed, semimetallic rectifier and weld stabilized circuit is now available in the SRH models. Developed specifically to save room, the SRH is only 30¼" high, offers 200, 300 and 400 ampere machines ideally designed for stacking or paralleling in minimum space.

Complete particulars on the new Miller GOLD STAR SRH will be sent promptly on request.

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Some Export Prices Cut

The United States Steel Export Co., New York, subsidiary of the U. S. Steel Corp., reduced its export price bases on sheets and cold rolled strip (0.25 carbon and under), effective Feb. 21.

The action brings the company's prices more in line with domestic delivered prices at seaboard.

Its new and former export price bases, with freight included to New York, Philadelphia, or Baltimore, are:

Product	New Price (Cents per lb)	Former Price (Cents per lb)
H.R. sheets (18-gage, heavier)	5.41	5.37
C.R. sheets—carbon	6.49	6.72
Galvanized sheets	6.74	7.04
Long terne sheets	7.80	8.03
Vitrenamel sheets	7.13	7.37
C.R. Strip (0.25 carbon, under)	7.67	7.81

Semifinished Steel . . .

Semifinished Prices, Page 153

Some steelmakers are still piling ingots in their yards despite the low ingot production. One Buffalo area mill last week was reported laying down ingots, an indication that even at its reduced rate of production it is running ahead of orders.

At Youngstown, though, some executives note signs of a slight improvement in the outlook for steel operations. One producer reports an increasing number of inquiries, which could bring a sharp boost in steelmaking if sufficient orders result.

Adverse weather recently has hampered some steel operations. In Alabama, for instance, heavy snow and the coldest weather in 10 years

forced a cut in finishing mill operations and halted production at some electric furnaces. Blast furnace, open hearth furnace, and coke oven activities were not affected to any marked extent, but low gas supply curtailed manufacturing in the area for a few days.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 153

Spring pickup in reinforcing bar demand is anticipated as highway and building construction projects open up seasonally. Competition for orders is expected to be more severe than a year ago since fabricators' order backlogs are down.

Competition for pending highway work in the Los Angeles area last week was reported intense. Price shading is expected to develop there.

Both bar mills in the Seattle district are taking advantage of the current dull market to complete expansion projects. Bethlehem Pacific Coast Steel Corp. expects to begin operation of the first of two new electric furnaces next month, and is well along on construction of a blooming mill and other installations. Northwest Steel Rolling Mills Inc. is down for nearly a month to facilitate construction of an addition.

Steel Bars . . .

Bar Prices, Page 153

Steel bar producers are not worrying about a further drop in orders. They are concerned about when there is going to be an appreciable pickup in buying. Trading reflects slightly improved demand, but consumers are still buying largely on a spot basis.

Hot-rolled carbon bars are available for delivery within two weeks. Pretty much the same is offered on cold-drawn bars. Alloy bar shipments also are easy.

At Pittsburgh, hot-rolled bars are moving in light volume to machine tool builders, automakers, and producers of fasteners. March tonnage should equal February's, though a thorough appraisal is difficult because of the short leadtime called for on most orders. Miscellaneous fabricators have cut their stocks sharply. Producers say this could stimulate ordering.

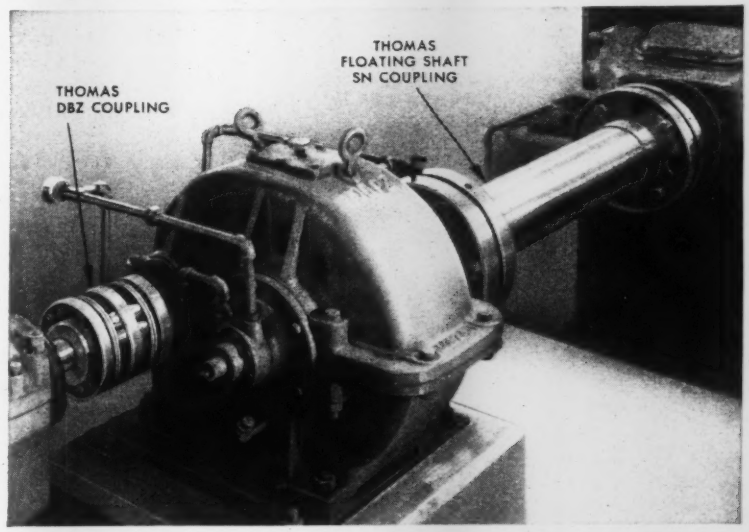
Only a minor upturn in bar demand for March shipment is noted in New England. Users there are ordering small lots for prompt shipment from stock, or within two to three weeks' leadtime. Consumers' operations are well below capacity in the district. The situation works against the building up of inventories because mill shipments are prompt.

Manufacturers are still drawing on inventories. Though stocks are getting low in some cases, it is not likely many users will soon be making a determined effort to replenish supplies. In fact, some consuming lines are still contracting. In the Midwest, for example, International Harvester Co. has announced it will close three plants for a week starting Mar. 10. They are in Indianapolis, Ft. Wayne, Ind., and Springfield, Ohio. All make truck parts or engines.

On the bright side, Caterpillar Tractor Co. will return to a five-day week this month at four plants —Peoria and Joliet, Ill., Milwaukee,

THOMAS FLEXIBLE COUPLINGS

Give You Freedom From Coupling Maintenance



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Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Couplings should last a lifetime.

Under Load and Misalignment only Thomas Flexible Couplings offer all these advantages:

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Write for Engineering Catalog 51A

THOMAS FLEXIBLE COUPLING COMPANY
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Fast Delivery

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INDUSTRIAL
CUT GEARS

★ FINISHED GEARS
★ CUSTOM GEAR CUTTING
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GEAR & MFG. CO.
LIBERTY at 25TH PITTSBURGH 22, PA.

Quality Gears for over 65 years

and San Leandro, Calif. They have been on a four-day week since Jan. 13.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 154 & 155

Although there are scattered indications of increased consumer interest in sheets, failure of automotive demand to burgeon as spring approaches puts a damper on optimism in this market. The auto builders are still cutting production schedules, and expectations are that March auto sheet volume will be as low, or lower, than that in February.

Reports from Detroit are that auto buying is likely to remain slow through the second quarter. Production cutbacks temporarily have increased car builders' steel inventories to 22-26 days in some cases. Their aim is still to keep stocks at a 12 to 15 day level.

An auto plant in the Pittsburgh area canceled most of its February sheet orders. Its March volume won't better February's by much. A number of Ford plants have cut production—at Cleveland, Buffalo, and Somerville, Mass.—to mention a few outside the Detroit area.

This disappointing showing on the part of the automotive industry is serving to increase the gloom in the sheet market. Sellers say a stepup in auto orders would not only be important in itself, but it would stimulate buying in other market areas.

Over-all sheet demand is fairly well sustained. But a sharp lift in buying is needed to bolster market confidence. This isn't immediately in sight. Auto builders are not the only people leaning heavily on stocks. Appliance manufacturers are, too. Generally, consumption is thought to be outrunning production, and spring usually brings a surge in ordering. Current prompt shipment demand indicates unbalanced inventories exist.

Sheet production is maintained in the St. Louis district at a high rate. But the order backlog there is only fair. High steel operations in the area are bolstered by Granite City Steel Co.'s capacity rate as it seeks to build a coil stockpile in anticipation of an early shutdown for mill improvements.

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strengthening a bit as the farm repair season nears.

Tubular Goods . . .

Tubular Goods Prices, Page 157

Suppliers of oil country tubing say drilling is at a low and that drillers have not completed their inventory reduction. Sellers hope that the improvement in the weather will stimulate drilling activity. In February, the number of operating rigs was well below the average for the first quarter last year.

The sales outlook for specialty tubing is brighter as the trend to deeper wells and higher pressures continues. In addition, gas producers are expected to have a busy year.

All sizes of seamless pipe are available for normal delivery. New England utilities, covering needs through the first half of this year, have entered about 50 per cent less tonnage than they did a year ago.

Distributors' stocks are well balanced, but March orders are slightly heavier. Mechanical and pressure tubing is slow, and the carbon grades can be shipped promptly.

Demand for cast iron pipe and fittings is seasonally active. Fair tonnages are coming out for figures.

Grayloc tubing, designed for high pressure oil wells, is being produced by Jones & Laughlin Steel Corp., Pittsburgh. It is being turned out under a licensing agreement with Gray Tool Co., Houston, and is being marketed through Jones & Laughlin Supply Div., Tulsa, Okla.

The tubing features an effective high pressure seal which has previously been used extensively for connections on wellhead equipment. Its application on tubing is designed to meet the increasing demands of deeper wells and the tapping of formations with greater pressures.

Prospects for tubing and oil country goods appear a little brighter at some points. L. M. Hogan, sales vice president, Standard Tube Co., Detroit, says major oil firms have indicated they will be buying in May and June for third quarter delivery.

The oil industry estimates that well drilling will be 15 per cent below what it was in 1957. Metalworking sales to drilling firms are off about 70 per cent as drillers

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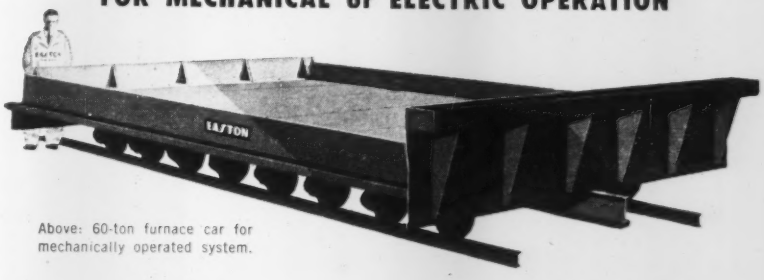

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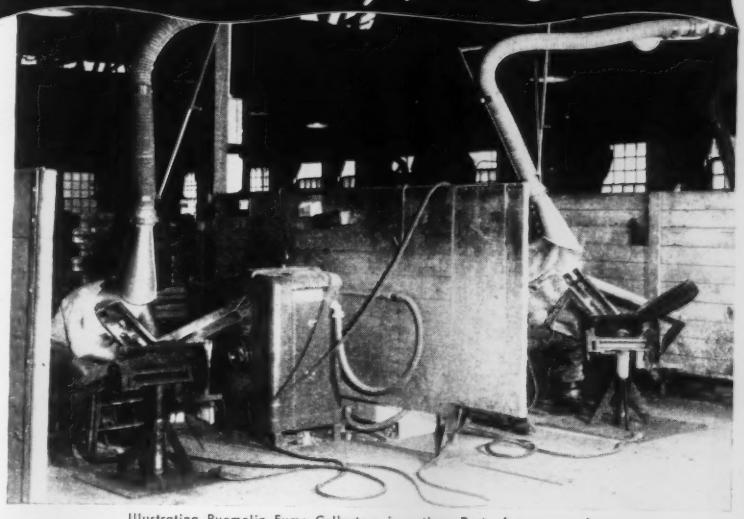

Illustrating Ruemelin Fume Collectors in action. Part of a group of sixteen collectors at plant of Sterling Wheelbarrow Co., Milwaukee.

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Fastener Facts

by Henry Peterson, Chief Engineer — Judson L. Thomson Mfg. Co.

FASTENING WITH DEEP-DRILLED RIVETS

DESIGN PRODUCTION & PURCHASING DATA

When to specify:

You specify deep-drilled rivets (sometimes called tubular rivets), when you want low-cost, permanent fasteners for leather, plastics, rubber, wood, canvas and other easily-pierced, compressible materials.

Millions of Thomson Deep-Drilled Rivets are used each year by leading manufacturers of leather goods, luggage, shoe skates, baseball shoes, camera cases, hand bags, golf bags, and other sporting goods. These self-piercing rivets are used to replace or reinforce stitching.

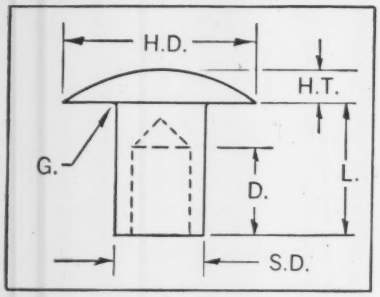
How you benefit:

With Thomson Deep-Drilled Rivets, you can eliminate the cost of pre-punching or pre-drilling holes in materials. Drilled to a depth up to $\frac{1}{2}$" they punch their own holes through the material and compress it within their hollow shanks. Clinched by high-speed automatic rivet-setting machines, which can be operated by unskilled help, they keep assembly time and costs at a minimum.

What dimensions:

Hole Depth (D) of standard deep-drilled rivets always exceeds shank diameter, but never exceeds $\frac{1}{2}$". Exact depth is determined by the compressibility of materials to be fastened and by the clinch requirements of the application. A rule of thumb is to add shank diameter to the thickness of the compressed assembly. The safe rule is to have tests run on actual samples.

Head Diameter (H.D.) ranges between 1.75 and 2.75 times shank diameter for rivets produced by single-blow heading machines. Head diameters up to $3\frac{1}{2}$ times shank diameter are possible . . . at higher cost.



Head Thickness (H.T.) ranges from 0.3 to 0.6 times shank diameter, depending on head shape: oval, flat countersunk, ideal, beveled flat countersunk or cone.

Shank Diameter (S.D.) of standard sizes ranges from .040" to .320".

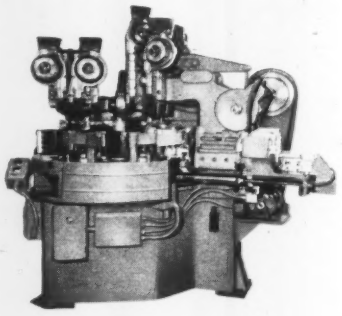
How Clinched:

You have a choice of two clinches with Thomson Deep-Drilled Rivets, depending on the required strength: roll clinch or scored clinch. Roll clinch, produced by correctly-shaped anvils (either solid or spring pilot type), is stronger. Scored clinch is specified when clinch must be turned into the surface of the work.

Thomson Deep-Drilled Rivets are also clinched inside caps which match rivet heads to improve the appearance of the assembly and increase the strength. Washers (burrs) are also used to prevent the clinch from tearing loose by giving a stronger bearing against soft surfaces.

High Speed Setting Machines:

The inherent economy of rivets as fasteners is multiplied by high-speed assembly with automatic rivet-setting machines. Thomson has developed more than 250 styles of machines which can do thousands of fastening jobs . . . with or without adaptations. Multiple rivet-setting heads, special work handling and loading fixtures are optional features that accelerate riveting operations. Thomson selects and custom-tools the proper machine to speed assembly and reduce costs. Available on a sale or lease basis.



Automatic Rivet-Setting Machine

Design and engineering service:

Thomson analyzes your company's fastening problems and makes specific rivet and machine recommendations . . . at your request. When called in early, we can often meet your requirements with standard rivets and machines that eliminate the need for costly special fasteners and tooling. For work in progress, submit sketches, prints or samples for suggestions and quotations.

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JUDSON L. THOMSON MFG. CO., WALTHAM 54, MASS.

work off excessively heavy tubing and casing inventories.

One tubemaker with national distribution says it finds the Pacific Coast about the strongest metalworking area in the country. A slight increase in missilework there, particularly ground handling equipment, has added a healthier glow to the situation.

Tubing sales to the automotive industry are down at least 45 per cent from a year ago, one producer estimates.

Plates . . .

Plate Prices, Page 153

While plate demand is relatively more active than that for most steel products, the decline in orders since the beginning of the year has been more pronounced. Now, though, a leveling off appears to be underway, and as spring approaches buying is expected to be bolstered by construction requirements and livelier activity in heavy tank work.

One large eastern producer of sheared plates is booked up for March, but most other mills can accept tonnage for delivery this month. Certain makers offer deliveries within two to three weeks. March schedules of most platemakers, it appears, are filling less readily than had been anticipated.

The eastern producer still operating full is engaged nearly 70 per cent on specialty work. Some increase in small tank inquiry is noted.

Builders of heavy electrical equipment continue to take plates in substantial volume in New England, but demand for weldments is only fair. Demand for high tensile alloy has slackened less than that for carbon grades.

Clad steel is available for delivery in six to eight weeks, heads four to five. Sheared carbon plate deliveries run two to three weeks on the average, alloy plates four to five. Strip plate can be had within 10 days.

Most consumers have better plate stocks on hand than in a long time, and their current buying is largely to plug gaps in inventories. Producers anticipate little change in the market situation in the weeks immediately ahead, but think second quarter volume will show some gain. In addition to seasonal factors, prospective higher prices at midyear should stimulate buying.

Pacific Northwest fabricators report their estimating staffs are busy on numerous projects involving substantial plate tonnages. Pending are a number of tanks for military installations.

Bethlehem Steel Co. plans to suspend operations at its 160-in. Sparrows Point mill during the last two weeks of April to link it with auxiliary equipment.

Warehouse . . .

Warehouse Prices, Page 158

Volume in most products booked by steel distributors in February was disappointing. Users of plates and structurals reduced inventories by restricting new purchases, while users of sheets continued to hold stocks low.

There's no sign of a change in the demand pattern this month, except for possible seasonal gains in wire product sales for home and farm improvement.

Demand for most flat-rolled products is dull. Tin plate, which is selling well at the mills, is moving slowly at warehouses.

A distributor in the Pittsburgh district reports price weakness continues in secondary material, although supply is declining as the result of lower mill operations. Prices remain firm on prime material.

In the Los Angeles district, distributors look to increased highway and building construction projects to accelerate bookings in the second quarter.

Rails, Car . . .

Track Material Prices, Page 156

Freight car orders in January totaled only 401 units, vs. 3492 placed in December, 1957, and 6304 in January, '57, according to a joint announcement of the American Railway Car Institute and the Association of American Railroads.

January car deliveries totaled 7219, vs. 6174 the previous month and 8403 in January, 1957.

Cars on order and undelivered as of Feb. 1 numbered 48,787, against 55,941 on Jan. 1 and 114,656 on Feb. 1, 1957.

Structural Shapes . . .

Structural Shape Prices, Page 153

Inquiry for structural steel is increasing. Eastern architects and engineers have considerable work on their boards, giving promise of a good potential demand later this year. Currently, fabricators' backlogs are continuing to shrink. Most small shops have practically no unfilled orders, and they are quoting low prices in an effort to keep their shops occupied.

The large and medium sized fabricators still have fairly substantial unfilled tonnage, but some of these interests are also cutting prices as they seek to maintain their position. Work that formerly would be ignored by some shops is being actively bid on.

More shops are quoting on individual tonnages, notably those shops with small backlogs and enlarged capacity. The lower prices being offered, of course, are at the expense of profit margins as plain material quotations are being held firmly by the mills even though supply is in excess of demand.

Pittsburgh structural mills are not equalizing with eastern Pennsylvania producers on freight to New England where the average rate runs around $4.50 a ton. Bridge builders and other buyers operating under competitive bidding are slower to close on steel as they put pressure on original estimates.

Producers of structurals in some areas adjacent to Pittsburgh are sending potential customers copies of their rolling schedules, hoping to secure orders that might otherwise go elsewhere. Users can obtain deliveries of wide flange beams without delay.

Short term prospects for fabricators on the Pacific Coast are bright. In the Pacific Northwest, several large projects are pending, or will come out shortly for bids. The largest is the Ft. Peck-Bismarck transmission line involving more than 10,000 tons, bids Apr. 1. In addition, bridge and highway work in Oregon, Washington, and Idaho offer fabricating plants numerous projects involving attractive tonnages.

Inland Steel Co., Chicago, has placed orders for equipment which will make its 28-in. structural mill more flexible. Contracts for two heating furnaces went to Salem-

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STEEL
The Metalworking Weekly

Brosius Inc., Pittsburgh. Mesta Machine Co., Pittsburgh, was awarded contracts for duplicate mill housings for the 44-in. universal mill, 34-in. edging mill, and 40-in. finishing mill. Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., received a contract for two hot saws.

The Mesta Company also was awarded contracts for steel handling tables, a hot bed, straightening gag, and other finishing machinery to equip another structural fabricating section.

The new equipment will double wide-flange beam production of the 28-in. mill. The expansion was announced last September. Inland started making wide-flange sections in the 40-year-old mill in 1955.

Plans also call for replacement of the 28-in. mill's rail finishing end with additional wide-flange finishing facilities. Upon completion in 1959, Inland will discontinue production of rails.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2870 tons, state bridge, PFC-TC 3518 Queens County, New York, through Horne Construction Co. Inc., New York, general contractor, to the American Bridge Div., U. S. Steel Corp., Pittsburgh.

2400 tons, office building, 125 Maiden Lane, New York, to the Harris Structural Steel Co., New York.

1200 tons, office building, Bankers Trust Co., 44th St. and Fifth Ave., New York, through the Diesel Construction Co. Inc., general contractor, to the Dreier Structural Steel Co. Inc., Long Island City, N. Y.

1115 tons, towers, American Gas & Service Corp., Lynchburg and Roanoke, Va., divided between American Bridge Div., U. S. Steel Corp., Pittsburgh, and SAE Fabricators, Milan, Italy.

900 tons, Delaware Park Race Track, Wilmington, Del., to the Belmont Iron Works, Eddystone, Pa.

500 tons, senior-junior high school, Whitehall Township, Pennsylvania, to the Lehigh Structural Steel Co., Allentown, Pa.

430 tons, Sloan-Kettering Institute, Rye, N. Y., through Wiggon-Abbott Corp., New York, to the Grand Iron Works, New York.

420 tons, West Shore Senior High School, Cumberland County, Pennsylvania, to the Dauphin Steel & Engineering Co.

290 tons, bridge work at Metuchen, N. J., for the Pennsylvania Railroad, awarded through Franklin Contracting Co., general contractor, to Irvington Steel & Iron Works, Irvington, N. J.

225 tons, gas and electric station, No. 4, Dunkirk, N. Y., through the Combustion Engineering Inc., New York, to the Bethlehem Steel Co., Bethlehem, Pa.

190 tons, state highway bridge, Route 102, Section 2-B, Warren and Hunterdon counties, New Jersey, through the Villa Contracting Co. Inc., general contractor to the Elizabeth Iron Works Inc., Union, N. J.

140 tons, Swift power project, Washington State, to A. Young & Co., Portland, Oreg.

STRUCTURAL STEEL PENDING

31,300 tons, approach work, Throggs Neck Bridge, Triborough Bridge & Tunnel Authority, Randalls Island, Manhattan, N. Y., bids, originally set for Feb. 25, will be readvertised; no new date set.

10,000 tons or more, 1467 transmission towers, 50 to 90 ft high, revised bids, two schedules, Ft. Peck-Bismarck line; bids to the U. S. Bureau of Reclamation, Denver, Apr. 1.

4000 tons, refinery, Kennecott Copper Co., Baltimore, pending; M. W. Kellogg Co., New York, engineer in charge.

1805 tons, leg extensions, etc., transmission line, Ft. Peck-Bismarck, bids to Denver, Apr. 1.

1700 tons, railroad warehouse, Portland, Oreg.; bids soon.

1000 tons or more, proposed Snake River (Idaho-Oregon) Bridge; plans in preparation, no date set.

600 tons, three-span continuous welded deck girder bridge, Hamlet Avenue, Woonsocket, R. I.; Halloran Construction Co., Providence, R. I., low bidder.

500 tons, bank building extension, Seattle; bids Mar. 11.

464 tons, state bridge, LR 797-5, Erie County, Pennsylvania; bids being readvertised for Mar. 4.

400 tons, Idaho bridge near Pocatello; bids soon.

315 tons, Alaska Way viaduct extension, Seattle; Morrison-Knudsen Co. and Rumsey & Co., Seattle, joint low at $2,978,878.

260 tons, bank building, Wilmington Trust Co., Wilmington, Del.; Turner Construction Co., Philadelphia, engineer.

220 tons, also 75 tons of reinforcing, Washington State truss bridge, King County; Lockyear & White, Longview, Wash., awarded at $292,958.

186 tons, state highway bridges, Longmeadow, Mass.; Lane Construction Co., Meriden, Conn., low.

100 tons, plus, two highway spans, Mt. McKinley Park, Alaska; H. Flecksing & Co., Missoula, Mont., low at $536,255 to the Bureau of Public Roads, Juneau, Alaska.

REINFORCING BARS . . .

REINFORCING BARS PLACED

100 tons, Ballard High School, Seattle, to the Northwest Steel Rolling Mills Inc., Seattle; Baugh Construction Co., general contractor.

100 tons, Mercer Island School, Seattle, to the Northwest Steel Rolling Mills Inc., Seattle; John P. Hopkins, general contractor.

REINFORCING BARS PENDING

3040 tons, third phase of the Alaska Viaduct, Seattle; Morrison-Knudsen Co. and Rumsey & Co., Seattle, low joint base bid $2,978,878, transmission line; bids to the U. S. Bureau of Reclamation, Denver, Apr. 1.

335 tons, Washington State, two girder bridges, Chelan County; general contract to W. H. Hagman, Spokane, Wash., low at $306,261.

235 tons, Washington State, bridge, Clark County; general contract to Hannan Bros., Portland, Oreg., low at $293,354.

172 tons, state bridge work, LR 797-1, Erie County, Pennsylvania, bids Mar. 4.

112 tons, state bridge work, LR 797-5, Erie County, Pennsylvania, bids Mar. 4; 464 tons of structurals also required.

PLATES . . .

PLATES PLACED

175 tons, oxygen tanks, Air Products Co., Allentown, Pa., to the Bethlehem Steel Co., Bethlehem, Pa.

PLATES PENDING

100 tons plus, 25,000-bbl fuel storage tanks, Glasgow Air Base, Montana; P. S. Lord, Portland, Oreg., is low at $98,860 to the U. S. Engineer, Walla Walla, Wash.

100 tons plus, 250,000-gal water tank and facilities; bids to Willamina, Oreg., Mar. 4; alternatives for concrete tank.

100 tons or more, ten underground tanks and facilities for refueling system, Fairchild Air Base, Washington State; bids to the U. S. Engineer, Seattle, about Mar. 25.

PIPE . . .

CAST IRON PIPE PLACED

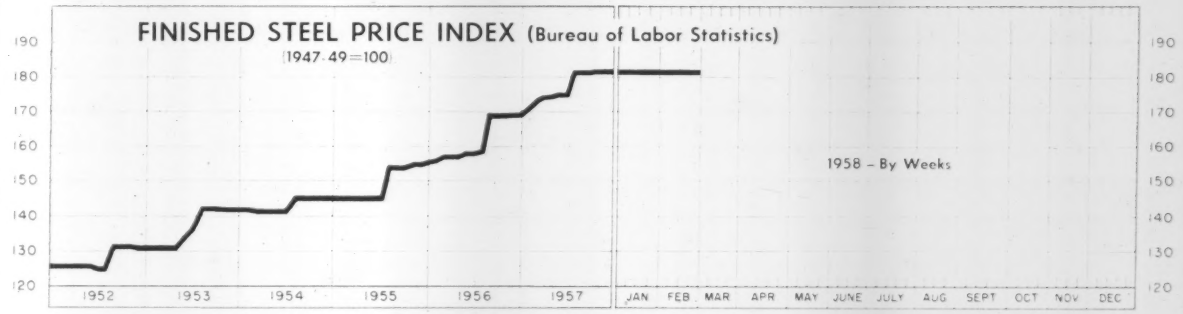
500 tons, assorted sizes for Portland, Oreg., to the U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

115 tons, various sizes; bids to Puyallup, Wash., Mar. 3.

100 tons, various sizes; bids to Helena, Mont., Mar. 3.

Price Indexes and Composites



Feb. 25, 1958	Week Ago	Month Ago	Feb. Avg.	Year Ago
181.8	181.8	181.7	181.7	173.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 25

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.600	Bars, Reinforcing	6.210
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.192
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.089
Structural Shapes	5.942	Sheets, Galvanized	8.270
Bars, Tool Steel, Carbon (lb)	0.535	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.650	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.355	Strip, C.R., Carbon	9.243
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.245
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
Tubes, Boiler (100 ft)	49.130	Black Plate, Canmaking Quality (95 lb base box)	7.583
Tubing, Mechanical, Carbon (100 ft)	24.953	Wire, Drawn, Carbon	10.225
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.653
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483	Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Feb. 26 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	227.10	181.31
Index in cents per lb	6.479	6.479	6.479	6.152	4.912

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$145.42	$145.42	$145.42	$139.60	$110.98
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT	37.17	37.17	35.50	52.50	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Feb. 26 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.725	5.365	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.545	5.31	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.10	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.10	5.10	5.10	5.70	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.975-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.475-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.49	6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.95	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, 7/32-5/8" Pitts.	6.15	6.15	6.15	5.80	4.425

PIG IRON, Gross Ton

	Feb. 26 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.41	70.41	70.01	66.26	59.25
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila.	70.91	70.91	70.51	66.76	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne	245.00†	245.00†	245.00†	255.00†	228.00*

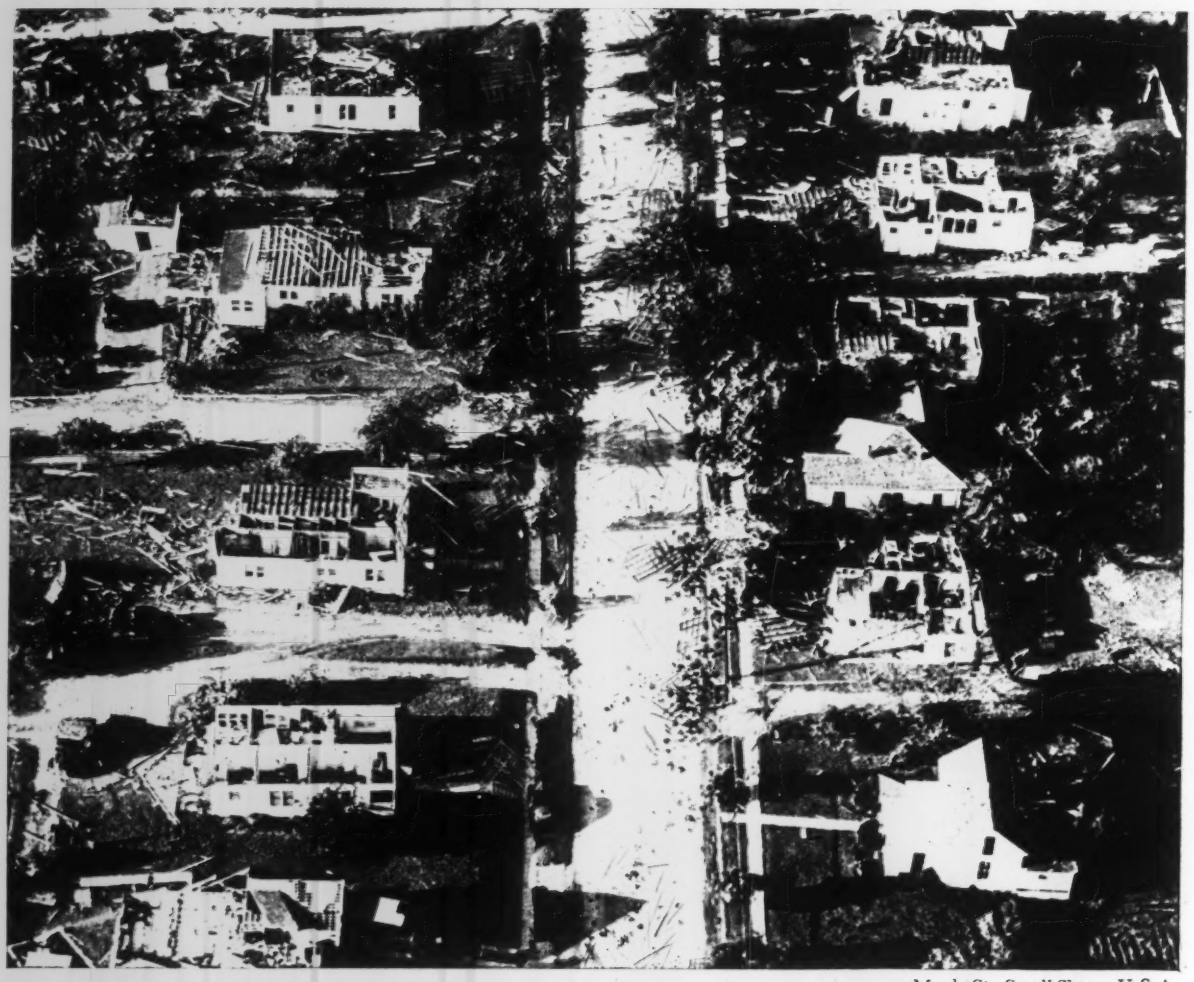
†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$35.50	$34.50	$33.50	$53.50	$44.00
No. 1 Heavy Melt, E. Pa.	38.50	38.50	38.50	56.50	41.50
No. 1 Heavy Melt, Chicago	37.50	38.50	34.50	47.50	42.50
No. 1 Heavy Melt, Valley	37.50	37.50	30.50	52.50	44.00
No. 1 Heavy Melt, Cleve.	33.50	33.50	29.50	50.50	43.00
No. 1 Heavy Melt, Buffalo	28.50	28.50	28.50	53.50	42.75
Rails, Rerolling, Chicago	54.50	54.50	53.50	63.50	52.50
No. 1 Cast, Chicago	41.50	41.50	42.50	45.50	43.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.00	17.00



Maple St., Small Town, U.S.A.

A TOWN WHERE "NOTHING EVER HAPPENS"...

A home town—like your town. A place where people said "it couldn't happen to us."

But it *did*. Like a whip, a great tornado lashed down Maple Street, splintering houses, leaving people hurt—homeless—panic-stricken.

A desperate call went out for the Red Cross and quickly, automatically, the team went into action.

Red Cross nurses slipped into uniform . . . volunteers set up first aid stations . . . canteens fed the hungry. Later, Red Cross money and work helped rebuild the town.

Last year was one of the worst disaster years of this century, and the year before, 1956, was almost as bad. Every month and in every state, the Red Cross strained to the limit as hurricanes, floods, tornadoes, forest fires swept across the country.

Red Cross receives no government funds—depends entirely upon *you* for support. Give as much as you can. Your dollars may go to your own town when it needs them most.

Join and Serve

SPACE CONTRIBUTED BY STEEL

Steel Prices

Mill prices as reported to STEEL, Feb. 26, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 154; to footnotes, page 156.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$73.50

INGOTS, Alloy (NT)
Detroit S41 ....$77.00
Farrell,Pa. S3 ....77.00
Lowellville,O. S3 ....77.00
Midland,Pa. C18 ....77.00
Munhall,Pa. U5 ....77.00
Sharon,Pa. S3 ....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Buffalo R2 ....77.50
Clairton,Pa. U5 ....77.50
Ensley,Ala. T2 ....77.50
Fairfield,Ala. T2 ....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 ....77.50
Johnstown,Pa. B3 ....77.50
Lackawanna,N.Y. B2..77.50
Munhall,Pa. U5 ....77.50
Owensboro,Ky. G8 ....77.50
S.Chicago,Ill. R2, U5..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 ....77.50
Youngstown R2 ....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Buffalo R2 ....96.00
Canton,O. R2 ....98.50
Clairton,Pa. U5 ....96.00
Conshohocken,Pa. A3. 101.00
Ensley,Ala. T2 ....96.00
Fairfield,Ala. T2 ....96.00
Fontana,Calif. K1 ....105.50
Gary,Ind. U5 ....96.00
Geneva,Utah C11 ....96.00
Houston S5 ....101.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 ....105.50
Midland,Pa. C18 ....96.00
Munhall,Pa. U5 ....96.00
Owensboro,Ky. G8 ....96.00
Seattle B3 ....109.50
Sharon,Pa. S3 ....96.00
S.Chicago R2, U5, W14..96.00
S.Duquesne,Pa. U5 ...96.00
S.SanFrancisco B3 ...105.50
Warren,O. C17 ....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$114.00
Bridgeport,Conn. C32..114.00
Buffalo R2 ....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3 ..121.00
Detroit S41 ....114.00
Economy,Pa. B14 ....114.00
Farrell,Pa. S3 ....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 ....114.00
Houston S5 ....119.00
Ind.Harbor,Ind. Y1 ..114.00
Johnstown,Pa. B2 ....114.00
Lackawanna,N.Y. B2 ..114.00
LosAngeles B3 ....134.00
Lowellville,O. S3 ....114.00
Massillon,O. R2 ....114.00
Midland,Pa. C18 ....114.00
Munhall,Pa. U5 ....114.00
Owensboro,Ky. G8 ....114.00
Sharon,Pa. S3 ....114.00
S.Chicago R2,U5,W14..114.00
S.Duquesne,Pa. U5 ...114.00
Struthers,O. Y1 ....114.00
Warren,O. C17 ....114.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$117.50
Canton,O. R2 ....120.00
Cleveland R2 ....117.50
Gary,Ind. U5 ....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ...117.50
Warren,O. C17 ....117.50

SKELP
Aliquippa,Pa. J5 ....5.075
Munhall,Pa. U5 ....4.875
Pittsburgh J5 ....5.075
Warren,O. R2 ....4.875
Youngstown R2, U5 ...4.875

WIRE RODS
AlabamaCity,Ala. R2 ...6.15
Aliquippa,Pa. J5 ....6.15
Alton,Ill. L1 ....6.35
Buffalo W12 ....6.15
Cleveland A7 ....6.15
Donora,Pa. A7 ....6.15
Fairfield,Ala. T2 ....6.15
Houston S5 ....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 ....6.15
Joliet,Ill. A7 ....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 ....6.25
LosAngeles B3 ....6.95
Minnequa,Colo. C10 ...6.40
Monessen,Pa. P7 ....6.15
N.Tonawanda,N.Y. B11..6.15
Pittsburg,Calif. C11 ...6.95
Portsmouth,O. P12 ....6.15
Roebling,N.J. R5 ....6.25
S.Chicago,Ill. R2 ....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill. (1) N15 ...6.15
Sterling,Ill. N15 ....6.25
Struthers,O. Y1 ....6.15
Worcester,Mass. A7 ...6.45

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.275
Atlanta A11 ....5.475
Aliquippa,Pa. J5 ....5.275
Bessemer,Ala. T2 ....5.275
Bethlehem,Pa. B2 ....5.325
Birmingham C15 ....5.275
Clairton,Pa. U5 ....5.275
Fairfield,Ala. T2 ....5.275
Fontana,Calif. K1 ....6.075
Gary,Ind. U5 ....5.275
Geneva,Utah C11 ....5.275
Houston S5 ....5.375
Ind.Harbor,Ind. I-2 ...5.275
Johnstown,Pa. B2 ....5.325
Joliet,Ill. P22 ....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2 ..5.325
LosAngeles B3 ....5.975
Minnequa,Colo. C10 ...5.575
Munhall,Pa. U5 ....5.275
Niles,Calif. P1 ....5.925
Phoenixville,Pa. P4 ...5.325
Portland,Oreg. O4 ....6.025
Seattle B3 ....6.025
S.Chicago,Ill. U5, W14..5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 ....5.275
Torrance,Calif. C11 ...5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 ....5.325
Clairton,Pa. U5 ....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2..5.275
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 ....5.275
Phoenixville,Pa. P4 ...5.325
S.Chicago,Ill. U5 ....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.55
Clairton,Pa. U5 ....6.55
Gary,Ind. U5 ....6.55
Houston S5 ....6.65
KansasCity,Mo. S5 ....6.65
Munhall,Pa. U5 ....6.55
S.Chicago,Ill. U5 ....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 ....7.75
Bessemer,Ala. T2 ....7.75
Bethlehem,Pa. B2 ....7.80
Clairton,Pa. U5 ....7.75
Fairfield,Ala. T2 ....7.75
Fontana,Calif. K1 ....8.55
Gary,Ind. U5 ....7.75
Geneva,Utah C11 ....7.75
Houston S5 ....7.85
Ind.Harbor,Ind. I-2, Y1..7.75
Johnstown,Pa. B2 ....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 ....8.45
Munhall,Pa. U5 ....7.75
Seattle B3 ....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 ....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 ....7.75
S.Chicago,Ill. U5 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 ....5.275
S.Chicago,Ill. U5 ....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 ....6.225
S.Chicago,Ill. U5 ....6.225
Weirton,W.Va. W6 ....6.225

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...5.10
Aliquippa,Pa. J5 ....5.10
Ashland,Ky.(15) A10 ...5.10
Bessemer,Ala. T2 ....5.10
Clairton,Pa. U5 ....5.10
Claymont,Del. C22 ....5.10
Cleveland J5, R2 ....5.20
Coatesville,Pa. L7 ....5.10
Conshohocken,Pa. A3 ...5.20
Ecorse,Mich. G5 ....5.20
Fairfield,Ala. T2 ....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 ....5.10
Geneva,Utah C11 ....5.10
GraniteCity,Ill. G4 ....5.30
Harrisburg,Pa. P4 ....5.10
Houston S5 ....5.20
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa. B2 ....5.10
Lackawanna,N.Y. B2 ...5.10
LoneStar,Tex. L6 ....5.20
Mansfield,O. E6 ....5.10
Minnequa,Colo. C10 ...5.95
Munhall,Pa. U5 ....5.10
Newport,Ky. A2 ....5.10
Pittsburgh J5 ....5.10
Riverdale,Ill. A1 ....5.10
Seattle B3 ....6.00
Sharon,Pa. S3 ....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 ....5.10
Steubenville,O. W10 ...5.10
Warren,O. R2 ....5.10
Youngstown U5, Y1 ...5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.75
Fontana,Calif. K1 ....7.55
Geneva,Utah C11 ....6.75
Houston S5 ....6.85
Johnstown,Pa. B2 ....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 ....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.625
Bessemer,Ala. T2 ....7.625
Clairton,Pa. U5 ....7.625
Claymont,Del. C22 ....7.625
Cleveland J5, R2 ....7.625
Coatesville,Pa. L7 ....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 ....7.625
Ecorse,Mich. G5 ....7.725
Fairfield,Ala. T2 ....7.625
Farrell,Pa. S3 ....7.625
Fontana,Calif.(30) K1..8.425
Gary,Ind. U5 ....7.625
Geneva,Utah C11 ....7.625
Houston S5 ....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 ....7.625
Munhall,Pa. U5 ....7.625
Pittsburgh J5 ....7.625
Seattle B3 ....8.525
Sharon,Pa. S3 ....7.625
S.Chicago,Ill. U5, W14 .7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 ....7.625
Youngstown U5 ....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 ....7.20
Claymont,Del. C22 ....7.20
Coatesville,Pa. L7 ....7.20
Economy,Pa. B14 ....7.20
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 ....7.20
Houston S5 ....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 ....7.20
Lowellville,O. S3 ....7.20
Munhall,Pa. U5 ....7.20
Newport,Ky. A2 ....7.20
Pittsburgh J5 ....7.20
Seattle B3 ....8.10
Sharon,Pa. S3 ....7.20
S.Chicago,Ill. U5, W14 ..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 ....7.20

FLOOR PLATES
Cleveland J5 ....6.175
Conshohocken,Pa. A3 ...6.175
Ind.Harbor,Ind. I-2 ...6.175
Munhall,Pa. U5 ....6.175
S.Chicago,Ill. U5 ....6.175

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.35
Ashland l.c.l.(15) A10..5.85
Cleveland c.l. R2 ....5.85
Warren,O. c.l. R2 ....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.425
Aliquippa,Pa.(9) J5 ...5.425
Alton,Ill. L1 ....5.625
Atlanta(9) A11 ....5.625
Bessemer,Ala.(9) T2 ...5.425
Birmingham(9) C15 ...5.425
Buffalo(9) R2 ....5.425
Clairton,Pa.(9) U5 ...5.425
Cleveland(9) R2 ....5.425
Ecorse,Mich.(9) G5 ...5.525
Emeryville,Calif. J7 ...6.175
Fairfield,Ala.(9) T2 ...5.425
Fairless,Pa.(9) U5 ...5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 ....5.425
Houston(9) S5 ....5.675
Ind.Harbor(9) I-2, Y1..5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 ....5.425
KansasCity,Mo.(9) S5 ..5.675
Lackawanna(9) B2 ...5.425
LosAngeles(9) B3 ....6.125
Midland,Pa.(23) C18 ..5.725
Milton,Pa. M18 ....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 ....6.125
N.T'wanda,N.Y.(23)B11 5.775
Owensboro,Ky.(9) G8 ..5.425
Pittsburg,Calif.(9) C11..6.125
Pittsburgh(9) J5 ....5.425
Portland,Oreg. O4 ....6.175
Seattle B3, N14 ....6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ...5.525
Struthers,O. Y1 ....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11..6.125
Youngstown(9) R2, U5..5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 ....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.475
Bethlehem,Pa. B2 ....6.475
Bridgeport,Conn. C32 ..6.55
Buffalo R2 ....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 ....6.475
Detroit S41 ....6.475
Economy,Pa. B14 ....6.475
Ecorse,Mich. G5 ....6.575
Fairless,Pa. U5 ....6.625
Farrell Pa. S3 ....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 ....6.475
Houston S5 ....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 ....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 ....6.475
LosAngeles B3 ....7.525
Massillon,O. R2 ....6.475
Midland,Pa. C18 ....6.475
Owensboro,Ky. G8 ....6.475
Pittsburgh J5 ....6.475
Sharon,Pa. S3 ....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 ....6.475
Warren,O. C17 ....6.475
Youngstown U5 ....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....7.925
Bessemer,Ala. T2 ....7.925
Bethlehem,Pa. B2 ....7.925
Clairton,Pa. U5 ....7.925
Cleveland R2 ....7.925
Ecorse,Mich. G5 ....8.025
Fairfield,Ala. T2 ....7.925
Fontana,Calif. K1 ....8.625
Gary,Ind. U5 ....7.925
Houston S5 ....8.175
Ind.Harbor,Ind. Y1 ....7.925
Johnstown,Pa. B2 ....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2 ..7.925
LosAngeles B3 ....8.625
Pittsburgh J5 ....7.925
Seattle B3 ....8.675
S.Chicago,Ill. U5, W14..7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 ....7.925
Youngstown U5 ....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 ....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 ....5.525
Sterling,Ill.(1) N15 ...5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.425
Atlanta A11 ....5.625
Joliet,Ill. P22 ....5.425
Niles,Calif. P1 ....6.125
Pittsburgh J5 ....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 ....6.275
Seattle B3 ....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.55
Clairton,Pa. U5 ....6.55
Gary,Ind. U5 ....6.55
Houston S5 ....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 ....6.55
Youngstown U5 ....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ....9.925
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 ....10.10
Chicago W18 ....9.925
Cleveland C20 ....9.925*
Elyria,O. W8 ....9.925
LosAngeles P2, S30 ..11.40*
Monaca,Pa. S17 ....9.925
Newark,N.J. W18 ....10.10
SpringCity,Pa. K3 ....10.10
Warren,O. C17 ....9.925

*Grade A; add 0.50c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 ....7.90
Bridgeport,Conn. C32 ..7.65
Buffalo B5 ....7.35
Camden,N.J. P13 ....7.75
Carnegie,Pa. C12 ....7.30
Chicago W18 ....7.30
Cleveland A7, C20 ....7.30
Detroit B5, P17 ....7.50
Detroit S41 ....7.30
Donora,Pa. A7 ....7.30
Elyria,O. W8 ....7.30
FranklinPark,Ill. N5 ...7.30
Gary,Ind. R2 ....7.30
GreenBay,Wis. F7 ....7.30
Hammond,Ind. J5, L2 ..7.30
Hartford,Conn. R2 ....7.80
Harvey,Ill. B5 ....7.30
LosAngeles(49) S30 ...8.75
LosAngeles P2, R2 ...8.75
Mansfield,Mass. B5 ...7.85
Massillon,O. R2, R8 ...7.30
Midland,Pa. C18 ....7.30
Monaca,Pa. S17 ....7.30
Newark,N.J. W18 ....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 ....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ...7.85
S.Chicago,Ill. W14 ....7.30
SpringCity,Pa. K3 ....7.75
Struthers,O. Y1 ....7.30
Warren,O. C17 ....7.30
Willimantic,Conn. J5 ...7.80
Waukegan,Ill. A7 ....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 .6.55

BARS, Cold Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa. M12,R2 8.775
Bethlehem,Pa. B2 ....8.775
Bridgeport,Conn. C32 ..8.925
Buffalo B5 ....8.775
Camden,N.J. P13 ....8.95
Canton,O. T7 ....8.775
Carnegie,Pa. C12 ....8.775
Chicago W18 ....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 ....8.975
Detroit S41 ....8.775
Donora,Pa. A7 ....8.775
Elyria,O. W8 ....8.775
FranklinPark,Ill. N5 ..8.775
Gary,Ind. R2 ....8.775
GreenBay,Wis. F7 ....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 ....9.075
Harvey,Ill. B5 ....8.775
Lackawanna,N.Y. B2 ..8.775
LosAngeles P2, S30 ...10.75
Mansfield,Mass. B5 ...9.075
Massillon,O. R2, R8 ...8.775
Midland,Pa. C18 ....8.775
Monaca,Pa. S17 ....8.775
Newark,N.J. W18 ....8.95
Plymouth,Mich. P5 ....8.975
S.Chicago,Ill. W14 ....8.775
SpringCity,Pa. K3 ....8.95
Struthers,O. Y1 ....8.775
Warren,O. C17 ....8.775
Waukegan,Ill. A7 ....8.775
Willimantic,Conn. J5...9.075
Worcester,Mass. A7 ...9.075
Youngstown F3, Y1 ....8.775

BARS, Reinforcing (To Fabricators)

AlabamaCity,Ala. R2 ..5.425
Atlanta A11 .....5.625
Birmingham C15 .....5.425
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 ....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ...5.675
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 . 6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ... 6.175
SandSprings,Okla. S5 . 5.925
Seattle B3, N14 ..... 6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2 .5.425
Sterling,Ill.(1) N15 ..5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 . 6.00
Torrance,Calif. C11 . 6.125
Youngstown R2, U5 . 5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2, U8 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 ....7.08
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Philadelphia U8 .....7.38
Pittsburgh J5, U8 .....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ..7.08
St.Paul U8 .....7.92
Williamsport,Pa. S19 . 7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2..5.325
ChicagoHts.(4)(44) I-2 .5.425
ChicagoHts.(4) C2 ....5.425
Franklin,Pa. (3) F5 ...5.325
Franklin,Pa. (4) F5 ...5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O. (3) P11 ....5.325
Tonawanda(3) B12 ...5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa.(3) S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 ....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.675
Gary,Ind. U5 .....4.925
Geneva,Utah C11 .....5.025
GraniteCity,Ill(8) G4 ..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 ..4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 .....4.925
Pittsburg,Calif. C11 . 5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2 ..4.925
Steubenville,O. W10 ..4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R.(19) Ga. & Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ..8.10

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 .....7.375
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.025
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2 .7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ....7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairffeld,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ..6.05
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ....7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 ....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ...6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse,Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ....10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna(37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.95	7.20
Canton,O. R2	6.95	7.45
Fairfield T2	6.95	7.20
Gary,Ind. U5	6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	6.95	7.20
Irvin,Pa. U5	6.95	7.20
Kokomo,Ind. C16	7.05	...
MartinsFry. W10	6.95	7.20
Pitts.,Calif. C11	7.70	...
Pittsburgh J5	6.95	...
SparrowsPt. B2	6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.20

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 ..6.60‡
Ashland,Ky. A10 .....6.60‡
Canton,O. R2 .....6.60‡
Dover,O. E6 .....6.60‡
Fairfield,Ala. T2 .....6.60‡
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ...6.60‡
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 ....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown,O. A10 ....6.60‡
Pittsburg,Calif. C11 ...7.35*
Pittsburgh J5 .....6.60‡
SparrowsPt.,Md. B2 ..6.60‡
Warren,O. R2 .....6.60‡
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous ‡Continuous. †Noncontinuous.

SHEETS, Well Casing

Fontana, Calif. K1 ....7.175

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ..9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.425
Niles,O. (28) R2 .....7.425
Youngstown J5 .....7.275
Weirton,W.Va. W6 ....7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .9.25
Butler,Pa. A10 (type 2) .9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Fairfield,Ala. T2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2, Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ....8.65
Ind.Harbor,Ind. I-2 ...8.475
Yorkville,O. W10 .....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, R2, S3....7.00
Weirton,W.VA. W6 .....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.40

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allengheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W.Co.
N20 Neville Ferroalloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons; John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S10 Seneca Steel Service
S11 Stainless Steel Div., J&L Steel Corp.
S12 Southern Elec. Steel Co.
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Div., H. K. Porter Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27)	R2	4.925
Allenport,Pa.	P7	4.925
Alton,Ill.	L1	5.125
Ashland,Ky.(8)	A10	4.925
Atlanta	A11	5.125
Bessemer,Ala.	T2	4.925
Birmingham	C15	4.925
Buffalo(27)	R2	4.925
Conshohocken,Pa.	A3	4.975
Detroit	M1	5.025
Ecorse,Mich.	G5	5.025
Fairfield,Ala.	T2	4.925
Fontana,Calif.	K1	5.675
Gary,Ind.	U5	4.925
Ind.Harbor,Ind.	I-2, Y1	4.925
Johnstown,Pa.(25)	B2	4.925
Lackawanna,N.Y.(25)	B2	4.925
LosAngeles(25)	B3	5.675
Minnequa,Colo.	C10	6.025
Riverdale,Ill.	A1	4.925
SanFrancisco	S7	6.35
Seattle(25)	B3	5.925
Seattle	N14	6.35
Sharon,Pa.	S3	4.925
S.Chicago	W14	4.925
S.SanFrancisco(25)	B3	5.675
SparrowsPoint,Md.	B2	4.925
Sterling,Ill.(1)	N15	4.925
Sterling,Ill.	N15	5.025
Torrance,Calif.	C11	5.675
Warren,O.	R2	4.925
Weirton,W.Va.	W6	4.925
Youngstown	U5	4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa.	S18	8.10
Farrell,Pa.	S3	8.10
Gary,Ind.	U5	8.10
Houston	S5	8.35
Ind.Harbor,Ind.	Y1	8.10
KansasCity,Mo.	S5	8.35
LosAngeles	B3	9.30
Lowellville,O.	S3	8.10
Newport,Ky.	A2	8.10
Sharon,Pa.	A2, S3	8.10
S.Chicago,Ill.	W14	8.10
Youngstown	U5, Y1	8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala.	T2	7.325
Conshohocken,Pa.	A3	7.325
Ecorse,Mich.	G5	7.425
Fairfield,Ala.	T2	7.325
Farrell,Pa.	S3	7.325
Gary,Ind.	U5	7.325
Ind.Harbor,Ind.	I-2, Y1	7.325
Lackawanna,N.Y.	B2	7.325
LosAngeles(25)	B3	8.075
Seattle(25)	B3	8.325
Sharon,Pa.	S3	7.325
S.Chicago,Ill.	W14	7.325
S.SanFrancisco(25)	B3	8.075
SparrowsPoint,Md.	B2	7.325
Warren,O.	R2	7.325
Weirton,W.Va.	W6	7.325
Youngstown	U5, Y1	7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8)	A10	5.175
Warren,O.	R2	5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind.	G6	7.15
Baltimore	T6	7.15
Boston	T6	7.70
Buffalo	S40	7.15
Cleveland	A7, J5	7.15
Conshohocken,Pa.	A3	7.20
Dearborn,Mich.	D3	7.25
Detroit	D2, M1, P20	7.25
Dover,O.	G6	7.15
Ecorse,Mich.	G5	7.25
Evanston,Ill.	M22	7.25
Follansbee,W.Va.	F4	7.15
Fontana,Calif.	K1	9.00
FranklinPark,Ill.	T6	7.25
Ind.Harbor,Ind.	Y1	7.15
Indianapolis	J5	7.30
LosAngeles	J5	9.05
LosAngeles	C1	9.20
NewBedford,Mass.	R10	7.60
NewBritain(10)	S15	7.15
NewCastle,Pa.	B4, E5	7.15
NewHaven,Conn.	D2	7.60
NewKensington,Pa.	A6	7.15
Pawtucket,R.I.	R3	7.80
Pawtucket,R.I.	N8	7.70
Philadelphia	P24	7.70
Pittsburgh	J5	7.15
Riverdale,Ill.	A1	7.25
Rome,N.Y.(32)	R6	7.15
Sharon,Pa.	S3	7.15
Trenton,N.J.(31)	R5	8.60
Wallingford,Conn.	W2	7.60
Warren,O.	R2, T5	7.15
Weirton,W.Va.	W6	7.15
Worcester,Mass.	A7	7.70
Youngstown	J5, Y1	7.15

STRIP, Coid-Rolled Alloy

Boston	T6	15.40
Carnegie,Pa.	S18	15.05
Cleveland	A7	15.05
Dover,O.	G6	15.05
Farrell,Pa.	S3	15.05
FranklinPark,Ill.	T6	15.05
Harrison,N.J.	C18	15.05
Indianapolis	J5	15.20
Lowellville,O.	S3	15.05
Pawtucket,R.I.	N8	15.40
Riverdale,Ill.	A1	15.05
Sharon,Pa.	S3	15.05
Worcester,Mass.	A7	15.35
Youngstown	J5	15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland	A7	10.45
Dearborn,Mich.	D3	10.60
Dover,O.	G6	10.45
Ecorse,Mich.	G5	10.60
Farrell,Pa.	S3	10.50
Ind.Harbor,Ind.	Y1	10.65
Sharon,Pa.	S3	10.50
Warren,O.	R2	10.45

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.8CC	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.10	21.95	26.30
Buffalo W12	18.10	....	....
Fostoria,O. S1	18.30	22.15	....
FranklinPark,Ill. T6	18.45	22.30	26.65
Harrison,N.J. C18	18.10	21.95	26.30
New York W3	18.10	21.95	26.30
Palmer,Mass. W12	18.10	....	....
Trenton,N.J. R5	18.10	21.95	26.30
Worcester,Mass. A7, T6	18.10	21.95	26.30
Youngstown J5	18.45	22.30	26.65

SILICON STEEL

H.R.SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625‡	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.15	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10	....	11.35†	12.05	13.15	14.20

	Stator
Vandergrift,Pa. U5	7.85

H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	15.00	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	15.25††
Butler,Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower. ††Coils only.

STRIP, Galvanized (Continuous)

Sharon,Pa.	S3	7.275

TIGHT COOPERAGE HOOP

Atlanta	A11	5.65
Riverdale,Ill.	A1	5.50
Sharon,Pa.	S3	5.35
Youngstown	U5	5.35

STRIP, Cold-Rolled Ingot Iron

Warren,O.	R2	7.90

STRIP, C.R. Electrogalvanized

Cleveland	A7	7.15*
Dover,O.	G6	7.15*
Evanston,Ill.	M22	7.25*
Riverdale,Ill.	A1	7.25*
Warren,O.	B9, T5	7.15*
Worcester,Mass.	A7	7.70*
Youngstown	J5	7.15*

*Plus galvanizing extras.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.	J5 $10.05	$10.30
Fairfield,Ala.	T2 10.15	10.40
Fairless,Pa.	U5 10.15	10.40
Fontana,Calif.	K1 10.80	11.05
Gary,Ind.	U5 10.05	10.30
Irvin,Pa.	U5 10.05	10.30
Pitts.,Calif.	C11 10.80	11.05
Sp.Pt.,Md.	B2 10.15	10.40
Weirton,W.Va.	W6 10.05	10.30
Yorkville,O.	W10 10.05	10.30

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2,Y1	7.85
Irvin,Pa. U5	7.85
Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa,Pa. J5	$7.50
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated, Base Box)	
Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)	
Gary,Ind. U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala.	R2	7.65
Aliquippa,Pa.	J5	7.65
Alton,Ill.	L1	7.85
Atlanta	A11	7.85
Bartonville,Ill.	K4	7.75
Buffalo	W12	7.65
Chicago	W13	7.65
Cleveland	A7, C20	7.65
Crawfordsville,Ind.	M8	7.75
Donora,Pa.	A7	7.65
Duluth	A7	7.65
Fairfield,Ala.	T2	7.65
Fostoria,O.(24)	S1	7.75
Houston	S5	7.90
Jacksonville,Fla.	M8	8.00
Johnstown,Pa.	B2	7.65
Joliet,Ill.	A7	7.65
KansasCity,Mo.	S5	7.90
Kokomo,Ind.	C16	7.75
LosAngeles	B3	8.60
Minnequa,Colo.	C10	7.90
Monessen,Pa.	P7, P16	7.65
N.Tonawanda,N.Y.	B11	7.65
Palmer,Mass.	W12	7.95
Pittsburg,Calif.	C11	8.60
Portsmouth,O.	P12	7.65
Rankin,Pa.	A7	7.65
S.Chicago,Ill.	R2	7.65
S.SanFrancisco	C10	8.60
SparrowsPoint,Md.	B2	7.75
Sterling,Ill.(1)	N15	7.65
Sterling,Ill.	N15	7.75
Struthers,O.	Y1	7.65
Waukegan,Ill.	A7	7.65
Worcester,Mass.	A7	7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill.	K4	12.65
Buffalo	W12	12.65
Cleveland	A7	12.65
Donora,Pa.	A7	12.65
Duluth	A7	12.65
Johnstown,Pa.	B2	12.65
Minnequa,Colo.	C10	12.775
Monessen,Pa.	P16	12.65
Muncie,Ind.	I-7	12.85
NewHaven,Conn.	A7	12.95
Palmer,Mass.	W12	12.95
Pittsburg,Calif.	C11	13.45
Portsmouth,O.	P12	12.65
Roebling,N.J.	R5	12.95
SparrowsPt.,Md.	B2	12.75
Struthers,O.	Y1	12.65
Trenton,N.J.	A7	12.95
Waukegan,Ill.	A7	12.65
Worcester,Mass.	A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa.	J5	9.30
Alton,Ill.	L1	9.50
Buffalo	W12	9.30
Cleveland	A7	9.30
Donora,Pa.	A7	9.30
Duluth	A7	9.30
Johnstown,Pa.	B2	9.30
KansasCity,Mo.	S5	9.55
LosAngeles	B3	10.25
Minnequa,Colo.	C10	9.50
Monessen,Pa.	P7, P16	9.30
NewHaven,Conn.	A7	9.60
Palmer,Mass.	W12	9.60
Pittsburg,Calif.	C11	10.25
Portsmouth,O.	P12	9.30
Roebling,N.J.	R5	9.30
S.Chicago,Ill.	R2	9.30
S.SanFrancisco	C10	10.25
SparrowsPt.,Md.	B2	9.40
Struthers,O.	Y1	9.30
Trenton,N.J.	A7	9.60
Waukegan,Ill.	A7	9.30
Worcester,Mass.	A7	9.60

WIRE, MB Spring, High-Carbon

Aliquippa,Pa.	J5	9.30
Alton,Ill.	L1	9.50
Bartonville,Ill.	K4	9.40
Buffalo	W12	9.30
Cleveland	A7	9.30
Donora,Pa.	A7	9.30
Duluth	A7	9.30
Fostoria,O.	S1	9.35
Johnstown,Pa.	B2	9.30
KansasCity,Mo.	S5	9.55
LosAngeles	B3	10.25
Milbury,Mass.(12)	N6	9.60
Minnequa,Colo.	C10	9.50
Monessen,Pa.	P7, P16	9.30
Muncie,Ind.	I-7	9.50
Palmer,Mass.(12)	W12	9.60
Pittsburg,Calif.	C11	10.25
Portsmouth,O.	P12	9.30
Roebling,N.J.	R5	9.60
S.Chicago,Ill.	R2	9.30
S.SanFrancisco	C10	10.25
SparrowsPt.,Md.	B2	9.40
Struthers,O.	Y1	9.30
Trenton,N.J.	A7	9.60
Waukegan,Ill.	A7	9.30
Worcester	A7, J4, T6	9.60

WIRE, Fine & Weaving (8" Coils)

Alton,Ill.	L1	15.80
Bartonville,Ill.	K4	15.70
Buffalo	W12	15.60
Chicago	W13	15.60
Cleveland	A7	15.60
Crawfordsville,Ind.	M8	15.70
Fostoria,O.	S1	15.60
Houston	S5	15.85
Jacksonville,Fla.	M8	15.95
Johnstown,Pa.	B2	15.60
KansasCity,Mo.	S5	15.85
Kokomo,Ind.	C16	15.60
Minnequa,Colo.	C10	15.85
Monessen,Pa.	P7, P16	15.60
Muncie,Ind.	I-7	15.80
Palmer,Mass.	W12	15.90
S.SanFrancisco	C10	16.45
Waukegan,Ill.	A7	15.60
Worcester,Mass.	A7, T6	15.90

ROPE WIRE (A)

Bartonville,Ill.	K4	12.75
Buffalo	W12	12.75
Fostoria,O.	S1	12.75
Johnstown,Pa.	B2	12.75
Monessen,Pa.	P7	12.75
Muncie,Ind.	I-7	12.95
Palmer,Mass.	W12	13.05
Portsmouth,O.	P12	12.75
Roebling,N.J.	R5	13.05
Struthers,O.	Y1	12.75
Worcester,Mass.	J4	13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	16.55
Monessen,Pa. P16	16.55
Roebling,N.J. R5	17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	11.65
Baltimore T6	11.95
Boston T6	11.95
Buffalo W12	11.65
Chicago W13	11.75
Cleveland A7	11.65
Crawfordsville,Ind. MS	11.65
Dover,O. G6	11.65
Fostoria,O. S1	11.65
FranklinPark,Ill. T6	11.75
Kokomo,Ind. C16	11.65
Massillon,O. R8	11.65
Milwaukee C23	11.85
Monessen,Pa. P7, P16	11.65
Palmer,Mass. W12	11.95
Pawtucket,R.I. N8	11.95
Philadelphia P24	11.95
Riverdale,Ill. A1	11.75
Rome,N.Y. R6	11.65
Sharon,Pa. S3	11.65
Trenton,N.J. R5	11.95
Warren,O. B9	11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. MS	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla.(20) MS	184
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$9.10

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. MS	177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Houston S5	180
Jacksonville,Fla.(20) MS	186
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
KansasCity,Mo. S5	180
Kokomo,Ind. C6	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	10.26
Chicago W13	10.26
Crawfordsville,Ind. MS	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. MS	10.82
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.60
Chicago W13	10.60
Crawfordsville,Ind. MS	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. MS	11.16
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.65
Chicago W13	10.65
Crawfordsville,Ind. MS	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. MS	11.21
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	10.75

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. MS	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. MS	219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt., Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

Birmingham C15	172
ChicagoHts.,Ill. C2, I-2	172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	172
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	174

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. MS	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. MS	203
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195*
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196*
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193*
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa. 9-14½ga. J5	190§
Atlanta A11	192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. MS	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. MS	197
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	17.15	18.95
Bartonville K4	17.25	19.05
Cleveland A7	17.15	....
Crawf'dsville MS	17.25	19.05
Fostoria,O. S1	17.65	19.20†
Houston S5	17.40	18.95**
Jacksonville MS	17.50	19.30
Johnstown B2	17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	17.25	18.80†
Minnequa C10	17.40	18.95**
P'lm'r,Mass. W12	17.45	19.00†
Pitts.,Calif. C11	17.50	19.05†
SparrowsPt. B2	17.25	19.05§
Sterling(37) N15	17.25	19.05††
Waukegan A7	17.15	18.70†
Worcester A7	17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala.	R2 8.65	9.20**
Aliquippa J5	8.65	9.325§
Atlanta(48)	A11 8.75	9.425*
Bartonville(48)	K4 8.75	9.425
Buffalo W12	8.65	9.20†
Cleveland A7	8.65	....
Crawfordsville MS	8.75	9.425
Donora,Pa. A7	8.65	9.20†
Duluth A7	8.65	9.20†
Fairfield T2	8.65	9.20†
Houston(48) S5	8.90	9.45**
Jacks'ville,Fla. MS	9.00	9.675
Johnstown B2(48)	8.65	9.325§
Joliet,Ill. A7	8.65	9.20†
Kans.City(48) S5	8.90	9.45**
Kokomo C16	8.75	9.30†
LosAngeles B3	9.60	10.275§
Minnequa C10	8.90	9.45**
Monessen P7(48)	8.65	9.25*
Palmer,Mass. W12	8.95	9.50†
Pitts.,Calif. C11	9.60	10.15†
Rankin,Pa. A7	8.65	9.20†
S.Chicago R2	8.65	9.20**
S.SanFran. C10	9.60	10.15**
Spar'wsPt.B2(48)	8.75	9.425§
Sterling(48) N15	8.90	9.575††
Sterling(1) (48)	8.80	9.475††
Struthers,O.(48) Y1	8.65	9.30‡
Worcester,Mass. A7	8.95	9.50†

Based on zinc price of: *13.50 †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter.... 49.0
Longer than 6 in.. .. 39.0
⅝ in. thru 1 in.:
6 in. and shorter.. 39.0
Longer than 6 in.. 35.0
1⅛ in. and larger:
All lengths 35.0
Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter.. 49.0

Carriage, Machine, Lag Bolts Hot Galvanized:
½ in. and smaller:
6 in. and shorter.. 29.0
Longer than 6 in.. .. 15.0
⅝ in. and larger:
All lengths 12.0

Lag Bolts (all diam.)
6 in. and shorter.. 49.0
Longer than 6 in.. .. 39.0

Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter ... 49.0
Larger than ½ in. or longer than 6 in... 39.0

Blank Bolts 39.0

Step, Elevator, Tire Bolts 49.0

Stove Bolts, Slotted:
⅛ to ¼ in. incl.. 3 in. and shorter. 55.0
⅜ to ½ in., inclusive 55.0

NUTS

Reg. & Heavy Square Nuts:
All sizes 55.5

Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:
¾ in. and smaller.. 60.5
⅞ in. to 1 in., incl. 55.5
1⅛ in. to 1½ in.. incl. 58.5
1⅝ in. and larger.. 53.5

Hex Nuts, Reg. & Heavy, Cold Punched:
¾ in. and smaller.. 60.5
⅞ in. to 1½ in., incl. 55.5
1⅝ in. and larger.. 53.5

Hex Nuts, All Types, Hot Galvanized:
¾ in. and smaller.. 46.5
⅞ in. to 1 in., incl. 41.5
1¼ in. to 1½ in.. incl. 46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):
¾ in. and smaller.. 60.5
⅞ in. to 1½ in.. incl. 55.5
1⅝ in. and larger.. 53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):
1 in. and smaller.. 63.0
1⅛ in. to 1½ in.. incl. 59.0
1⅝ in. and larger.. 53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):
⅝ in. and smaller.. 60.5
¾ in. to 1 in., incl. 63.0
1⅛ in. to 1½ in.. incl. 59.0
1⅝ in. and larger.. 53.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:
6 in. and shorter:
⅝ in. and smaller.. 40.0
¾, ⅞, and 1 in. diam. 22.0
Longer than 6 in.:
⅝ in. and smaller.. 8.0
¾, ⅞, and 1 in. diam. ..... + 6.0

High Carbon, Heat Treated:
6 in. and shorter:
⅝ in. and smaller.. 26.0
¾, ⅞, and 1 in. diam. 3.0
Longer than 6 in.:
⅝ in. and smaller.. + 13.0
¾, ⅞, and 1 in. diam. ..... + 32.0

Flat Head Capscrews:
¾ in. and smaller.. + 76.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter.. Net
Longer than 6 in.. + 23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in., larger 12.25
⅞ in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft., mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2½	12	46.99	55.06	41.81
2¾	12	51.76	60.65	46.05
3	12	56.04	65.67	49.88
	12	59.76	70.03	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All	Tee Rails 60 lb Under
Rail:				
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	....
Huntington,W.Va. C15	....	....	....	6.50
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	(16)6.50	....
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	6.60
Gary,Ind. U5	6.60
Ind.Harbor,Ind. I-2	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Seattle B3	6.75
Steelton,Pa. B2	6.60
Torrance,Calif. C11	6.75

JOINT BARS

Bessemer,Pa. U5	6.975
Fairfield,Ala. T2	6.975
Ind.Harbor,Ind. I-2	6.975
Joliet,Ill. U5	6.975
Lackawanna,N.Y. B2	6.975
Minnequa,Colo. C10	6.975
Steelton,Pa. B2	6.975

AXLES

Ind.Harbor,Ind. S13	8.775
Johnstown,Pa. B2	8.775

TRACK BOLTS, Untreated

Cleveland R2	14.75
KansasCity,Mo. S5	14.75
Lebanon,Pa. B2	14.75
Minnequa,Colo. C10	14.75
Pittsburgh P14	14.75
Seattle B3	15.25

SCREW SPIKES

Lebanon,Pa. B2	14.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	9.75
Lebanon,Pa. B2	9.75
Minnequa,Colo. C10	9.75
Pittsburgh J5	9.75
Seattle B3	10.25
S.Chicago,Ill. R2	9.75
Struthers,O. Y1	9.75
Youngstown R2	9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds: 9.30c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	+8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI	—Rerolling—		Forging	H.R.	H.R. Rods; C.F.	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
Type	Ingot	Slabs	Billets	Strip	Wire				
201	22.00	27.00	....	36.00	40.00	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	46.00	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.00	55.00
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	62.75
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	77.50	....	86.50	91.00	92.75	99.00	104.25
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	80.75	80.75
316L	....	55.50	70.00	76.50	77.00	80.75	84.50	89.25	88.50
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	95.25	106.75	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.00	48.25	48.25
420	26.00	33.50	34.25	41.75	39.25	41.25	45.25	52.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	42.00
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless:					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	39.75
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.50	49.50	54.50	58.25
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr-Hot Work	0.475
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.520
Oil Hardening	0.475	Hi-Carbon-Cr	0.925

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.285
18.25	4.25	1	4.75	....	2.500
18	4	2	9	....	2.870
18	4	2	....	....	1.960
18	4	1	....	....	1.795
9	3.5	..	....	....	1.395
13.5	4	3	....	....	2.060
13.75	3.75	2	5	....	2.440
6.4	4.5	1.9	....	5	1.300
6	4	3	....	6	1.545
1.5	4	1	....	8.5	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y. deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	68.00	68.50	69.00	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark,N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,Ohio, deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.61	....	8.76	9.06	11.34 #	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90 #	15.28	9.63	9.72	11.20
Buffalo	8.40	9.00	10.07	55.98	8.50	8.80	10.90 #	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.10	53.00	8.23	8.69	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	52.43	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	52.33	8.33	8.69	10.80 #	14.74	9.01	8.79	10.11
Dallas	8.85	10.15	....	....	9.00	8.95	11.01	....	9.00	9.45	10.70
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.45	56.50	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	7.45	8.75	8.45	....	7.60	7.55	11.10	....	7.60	8.05	10.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	8.50	10.75	11.65	57.60	8.55	8.55	12.00	....	8.60	8.55	9.95
Memphis, Tenn.	8.55	9.80	....	....	8.60	8.97	11.96 #	....	9.01	8.93	10.56
Milwaukee	8.33	9.58	10.23	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.31	9.57	12.76 #	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.92	52.69	8.69	8.65	11.51 #	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.45	52.00	8.33	8.60	10.80 #	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	9.55	8.65	14.50	15.95	8.65	8.30	11.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.46	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.71	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	55.10	9.45	9.70	13.00	16.10	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.00	57.38	10.00	10.10	14.05	17.20	9.80	9.70	12.10
Washington	8.88	....	....	....	9.36	9.56	10.94	....	9.79	9.26	10.74

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; # 1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [3]—400 to 9999 lb; [8]—1000 to 1999 lb; [9]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Ft. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $150; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa. Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $245.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Snow Shoe, Pa., $305.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Snow Shoe, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $33-34; Mexican, all rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over, f.o.b. Riverton or Camden, N. J., west of Mississippi River	9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	

	Dollars
Aluminum: Atomized, 500-lb drum, freight allowed: Carlots	39.50
Ton lots	41.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	30.30-45.70†
Bronze, 5000-lb lots	45.70-49.80†
Copper: Electrolytic	14.75*
Reduced	14.75*
Lead	7.50*
Manganese: Minus 35 mesh	61.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.15
Nickel-Silver, 5000-lb lots	47.80-52.60†
Phosphor-Copper, 5000-lb lots	57.80
Copper (atomized) 5000-lb lots	38.30-46.80‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.07
Stainless Steel, 316	$1.26
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡
Tungsten: Melting grade, 99% 60 to 200 mesh: 1000 lb and over	3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam	Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.88	$5.42	$5.42	$5.78
Bar Size Angles	5.77	5.65	5.65	5.95
Structural Angles	5.77	5.65	5.65	5.95
I-Beams	5.72	5.60	5.60	6.02
Channels	5.72	5.60	5.60	6.02
Plates (basic bessemer)	7.64	7.59	7.64	7.88
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.20	26.20	26.20	27.05
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.37	6.32	6.37	6.61
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (§)	8.12	8.12	8.12	8.32

†Per 82 lb, net, reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	27.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$12.00-12.50*
Domestic, concentrates f.o.b. milling points	20.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $135 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$50.00
48% 2.8:1	48.00
48% no ratio	39.00
South African Transvaal	
48% no ratio	$37.00
44% no ratio	27.00
Turkish	
48% 3:1	$55.00
Domestic Rail nearest seller	
18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.50-2.60
60-65%	2.60-2.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.25
Saginaw, Mich., deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.29
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa., 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively. (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2% from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38.43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.
Cr 67.71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, SM x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" down, 27.50c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.50 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, c.l. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 55c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags, 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 5 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l. pallets 16.2c; 2000 lb to c.l., bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l., bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si.) Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l., pallets 9.65c; 2000 lb to c.l., bags, 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

G. ALLAN MacNAMARA

Portrait by Fabian Bachrach

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STEEL
The Metalworking Weekly

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Slow Demand Checks Scrap's Rise

Upturn in prices is temporarily halted by the lack of strong consumer buying interest. STEEL's composite on the prime grade holds unchanged at $37.17

Scrap Prices, Page 164

Philadelphia — Scrap prices are steady here. While domestic buying is slow (only one mill is covering on the steel grades in a substantial amount) export shipments are holding up.

Foreign demand is expected to taper off later. England is out of the market entirely. Japan is short of cash, and continental European buyers are likely to show less interest during the second quarter. So far, only one cargo is scheduled to leave this port in March.

Although cast iron scrap prices are unchanged, the undertone in No. 1 cupola and heavy breakable is strong.

New York—The domestic scrap market is dull, and supplies are scarce. Both factors account for fairly steady prices. Except for a decline in No. 2 heavy melting to $29-$31, brokers' buying prices are unchanged throughout the list. In some grades, notably borings, turnings, low phos structurals and plates, trading is so light that prices are nominal.

Chicago — With no hint of a significant upturn in steel production in sight, the scrap market continues to lose some of its recent steam. Several important steelmaking grades are off $1 to $2 a ton, and further discounting is in prospect.

One consumer who has been restricting the flow of scrap into his plant, even though it has been contracted for, has clamped down further on the number of cars that can be shipped. Some consumers are out of the market for melting material. Most grades of scrap are in generous supply even though metalworking operations are off sharply.

Cleveland—With one steelworks in this district completely inoperative, and the other two on reduced schedules, the movement of scrap in this market is small. There is some foundry buying of the cast grades, and it has contributed an optimistic note in an otherwise inactive market. Prices are nominal, and the outcome of bids on month-end auto lists is expected to set the price pattern for the next few weeks.

Pittsburgh—Mill buying is absent, but brokers say the mills would have to pay $36 for No. 1 heavy melting tonnage. No. 2 bundles are slightly stronger, now selling at $30.

Demand continues dull, but a possible increase in steel production late this month or early in April contributes a little strength to the market.

Youngstown — The local scrap market outlook is slightly improved, but there have been no important sales the past week or so. Lighting of Republic Steel Corp.'s No. 2 blast furnace here, and the recent purchase of No. 1 heavy melting

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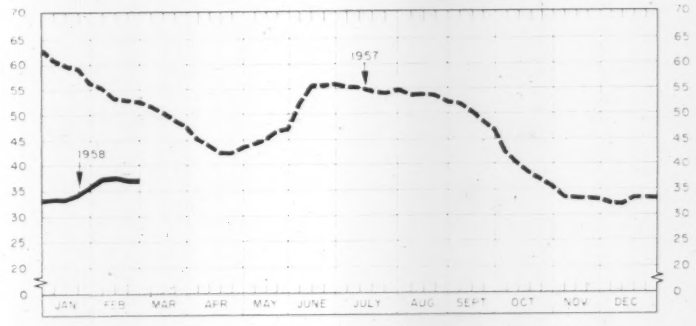
STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania—Compiled by STEEL.



Feb. 26 1958	Week Ago	Month Ago	Year Ago	Jan. Avg.
$37.17	$37.17	$35.50	$52.50	$34.10

by another district steelmaker within the past month, serve to stimulate a little optimism.

Buffalo—A few specialty grades of scrap have advanced on recent sales, but prices on the prime steelmaking grades remain depressed. Rails and railroad specialties are quoted higher. Random length rails are $47-$48, rail crops, $53-$54, and railroad specialties, $37-$38.

While district foundry operations are on reduced levels, cast iron scrap is moving in limited volume.

St. Louis—The undertone of the local scrap market is weaker. Mills are not getting new business and their stockpiles are high in proportion to operating rates. An exception is Granite City Steel Co. which is operating at capacity to stockpile coils against an anticipated shutdown for mill improvements.

Railroad scrap prices are up a trifle, but demand and offerings are low. Cast scrap demand has slackened after a brief spurt.

Detroit — Rumors of Canadian strikes and reports that next week's scrap lists will offer less than 10,000 tons of bundles have caused another wave of uncertainty to hit the local market. Small buys of foundry scrap in other districts have caused a sudden spurt in cast scrap prices. But the higher quotations are based on speculation, not local buying.

Cincinnati—The scrap trade here is awaiting signs of the spring pickup in market activity. Mills are expected to resume buying soon, but volume will be held down by the heavy inventories held by some producers. Brokers' buying prices are firm. No. 1 cupola last week moved up $1 a ton to $39-$40 on out-of-town buying.

Birmingham—Heavy snow and near zero weather in northern Alabama and other sections of the South early last week practically halted the movement of scrap in the district. Many consumers have built up inventories and are out of the market. Other buyers are having difficulty filling their needs at present prices despite substantial stocks in dealers' yards. Exporters are having trouble obtaining sufficient tonnage to complete cargoes.

Los Angeles—The scrap market here continues to be demoralized. The undertone is noticeably soft, and quoted prices have little meaning because of the absence of active consumer buying.

Seattle—The expected revival in the scrap market has not materialized. There is insufficient turnover to provide a basis for firm prices. Quotations are nominal.

Receipts are light, and exports continue lifeless.

San Francisco—The scrap market continues in the doldrums, but a little pickup in demand is anticipated this month. One of the area steelmakers has returned to production after three weeks' shutdown for repairs.

Pig Iron . . .

Pig Iron Prices, Page 158

With most foundries operating well below normal levels, merchant pig iron is moving slowly. Few foundries are running more than 32 hours a week and some are operating only 24. A midweek break in operations is used by some shops to permit an accumulation of orders for castings.

Following the dip in business in February, merchant pig iron sellers anticipate a slight improvement in March. There will be more working days, but sellers see no sign of a substantial gain in the daily rate

(*Please turn to Page* 169)

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Feb. 26, 1958. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 26	$37.17
Feb. 19	37.17
Jan. Avg.	34.10
Feb. 1957	53.41
Feb. 1953	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	32.00-33.00
No. 1 dealer bundles	*35.00-36.00*
No. 2 bundles	*29.00-30.00*
No. 1 busheling	*35.00-36.00*
No. 1 factory bundles	38.00-39.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	21.00-22.00
Cast iron borings	21.00-22.00
Cut structurals:	
2 ft and under	41.00-42.00
3 ft lengths	40.00-41.00
Heavy turnings	34.00-35.00
Punchings & plate scrap	40.00-41.00
Electric furnace bundles	40.00-41.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	40.00-41.00
Unstripped motor blocks	26.00-27.00
Clean auto cast	42.00-43.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Angles, splice bars	49.00-50.00
Rails, rerolling	57.00-58.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-185.00
18-8 turnings	85.00-90.00
430 bundles & solids	100.00-110.00
430 turnings	50.00-55.00

CLEVELAND

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	21.00-22.00
No. 1 factory bundles	33.00-34.00
No. 1 bundles	33.00-34.00
No. 2 bundles	23.00-24.00
No. 1 busheling	33.00-34.00
Machine shop turnings	11.00-12.00
Short shovel turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut foundry steel	36.00-37.00
Cut structurals, plates 2 ft and under	41.00-42.00
Low phos. punchings & plate	34.00-35.00
Alloy free, short shovel turnings	19.00-20.00
Electric furnace bundles	34.00-35.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	36.00-37.00
Heavy breakable cast	36.00-37.00
Stove plate	43.00-44.00
Unstripped motor blocks	26.00-27.00
Brake shoes	34.00-35.00
Clean auto cast	45.00-46.00
Burnt cast	33.00-34.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	60.00-61.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	50.00-51.00
Cast steel	47.00-48.00
Railroad specialties	51.00-52.00
Uncut tires	41.00-42.00
Angles, splice bars	51.00-52.00
Rails, rerolling	56.00-57.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	90.00-95.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	25.00-26.00
No. 1 busheling	37.00-38.00
No. 1 bundles	37.00-38.00
No. 2 bundles	24.00-25.00
Machine shop turnings	13.00-14.00
Short shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	38.00-39.00
Electric furnace bundles	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00-43.00

CHICAGO

No. 1 heavy melt., indus.	*37.00-39.00*
No. 1 hvy melt., dealer	*36.00-37.00*
No. 2 heavy melting	34.00-35.00
No. 1 factory bundles	41.00-42.00
No. 1 dealer bundles	*37.00-38.00*
No. 2 bundles	28.00-29.00
No. 1 busheling, indus.	39.00-40.00
No. 1 busheling, dealer	37.00-38.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Cut structurals, 3 ft	44.00-45.00
Punchings & plate scrap	45.00-46.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	38.00-39.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	46.00-47.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00-40.00*
R.R. malleable	*53.00-54.00*
Rails, 2 ft and under	54.00-55.00
Rails, 18 in. and under	55.00-56.00
Angles, splice bars	51.00-52.00
Axles	54.00-55.00
Rails, rerolling	54.00-55.00

Stainless Steel Scrap

18-8 bundles & solids	160.00-165.00
18-8 turnings	85.00-95.00
430 bundles & solids	90.00-100.00
430 turnings	47.50-52.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	23.00-24.00
No. 1 bundles	*29.00-30.00*
No. 2 bundles	20.00-21.00
No. 1 busheling	27.00-28.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	10.00-11.00
Short shovel turnings	11.00-12.00
Punchings & plate	29.00-30.00

Cast Iron Grades

No. 1 cupola	*33.00-34.00*
Stove plate	*27.00-28.00*
Charging box cast	*26.00-27.00*
Heavy breakable	*26.00-27.00*
Unstripped motor blocks	*19.00-20.00*
Clean auto cast	*37.00-38.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	33.00
No. 2 heavy melting	30.00
No. 1 bundles	33.00
No. 2 bundles	25.00
No. 1 busheling	33.00
Machine shop turnings	*18.00*
Short shovel turnings	*20.00*

Cast Iron Grades

No. 1 cupola	*45.00*
Charging box cast	*33.00*
Heavy breakable cast	*33.00*
Unstripped motor blocks	33.00
Clean auto cast	*45.00*
Stove plate	*41.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*38.00*
Rails, 18 in. and under	*56.00*
Rails, random lengths	*50.00*
Rails, rerolling	*58.00*
Angles, splice bars	*49.00*

PHILADELPHIA

No. 1 heavy melting	38.50
No. 2 heavy melting	35.00
No. 1 bundles	38.50
No. 2 bundles	28.00
No. 1 busheling	38.50
Electric furnace bundles	40.00
Mixed borings, turnings	22.50†
Short shovel turnings	24.00†
Machine shop turnings	22.00†
Heavy turnings	34.00†
Structurals & plate	43.00-44.00
Couplers, springs, wheels	46.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	40.00
Malleable	58.00
Drop broken machinery	49.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	34.00-36.00
No. 2 heavy melting	*29.00-31.00*
No. 1 bundles	34.00-36.00
No. 2 bundles	23.00-24.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	12.00-13.00
Short shovel turnings	14.00-15.00
Low phos. (structurals & plate)	Nominal

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	32.00
Heavy breakable	32.00-33.00

Stainless Steel

18-8 sheets, clips, solids	140.00-150.00
18-8 borings, turnings	50.00
410 sheets, clips, solids	60.00-65.00
430 sheets, clips, solids	75.00-80.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	30.00
No. 2 heavy melting	22.00
No. 1 bundles	29.00
No. 2 bundles	17.00
No. 1 busheling	29.00
Machine shop turnings	9.50-10.00†
Mixed borings, turnings	9.50-10.00
Short shovel turnings	11.00-11.50†
No. 1 cast	29.00-30.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	35.00-36.00

†Nominal

BUFFALO

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 2 bundles	23.00-24.00
No. 1 busheling	28.00-29.00
Mixed borings, turnings	14.00-15.00
Machine shop turnings	12.00-13.00
Short shovel turnings	15.00-16.00
Cast iron borings	14.00-15.00
Low phos.	32.00-33.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	39.00-40.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	*47.00-48.00*
Rails, 3 ft and under	*53.00-54.00*
Railroad specialties	*37.00-38.00*

CINCINNATI

(Brokers' buying prices; f.o.b shipping point)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.50-25.50
No. 1 bundles	29.00-30.00
No. 2 bundles	23.00-24.00
No. 1 busheling	29.00-30.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	18.00-19.00
Cast iron borings	15.00-16.00
Low phos. 18 in.	38.00-39.00

Cast Iron Grades

No. 1 cupola	*39.00-40.00*
Heavy breakable cast	33.00-34.00
Charging box cast	33.00-34.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	44.00-45.00

BIRMINGHAM

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	27.00-28.00
No. 1 bundles	31.00-32.00
No. 2 bundles	*21.00-22.00*
No. 1 busheling	31.00-32.00
Cast iron borings	12.00-13.00
Machine shop turnings	*24.00-25.00*
Short shovel turnings	*25.00-26.00*
Bar crops and plates	39.00-40.00
Structurals & plate	38.00-39.00
Electric furnace bundles	36.00-37.00
Electric furnace:	
2 ft and under	35.00-36.00
3 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	49.00-50.00
Unstripped motor blocks	40.00-41.00
Charging box cast	22.00-23.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	49.00-50.00
Rails, rerolling	*49.00-50.00*
Rails, random lengths	43.00-44.00
Angles, splice bars	42.00-43.00

SEATTLE

No. 1 heavy melting	28.00
No. 2 heavy melting	26.00
No. 1 bundles	22.00
No. 2 bundles	21.00
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Electric furnace No. 1	38.00

Cast Iron Grades

No. 1 cupola	31.00
Heavy breakable cast	28.00
Unstripped motor blocks	23.00
Stove plate (f.o.b. plant)	21.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	28.00
No. 2 bundles	20.00
Machine shop turnings	9.00
Shoveling turnings	11.00
Cast iron borings	10.00
Cut structurals and plate 1 ft and under	43.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	38.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	22.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Cast iron borings	15.00
Heavy turnings	15.00
Short shovel turnings	15.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

No. 1 heavy melting	32.00
No. 2 heavy melting	27.00
No. 1 bundles	32.00
No. 2 bundles	22.00
Mixed steel scrap	27.00
Mixed borings, turnings	17.00
Busheling, new factory:	
Prepared	32.00
Unprepared	26.00
Short steel turnings	21.00

Cast Iron Grades†

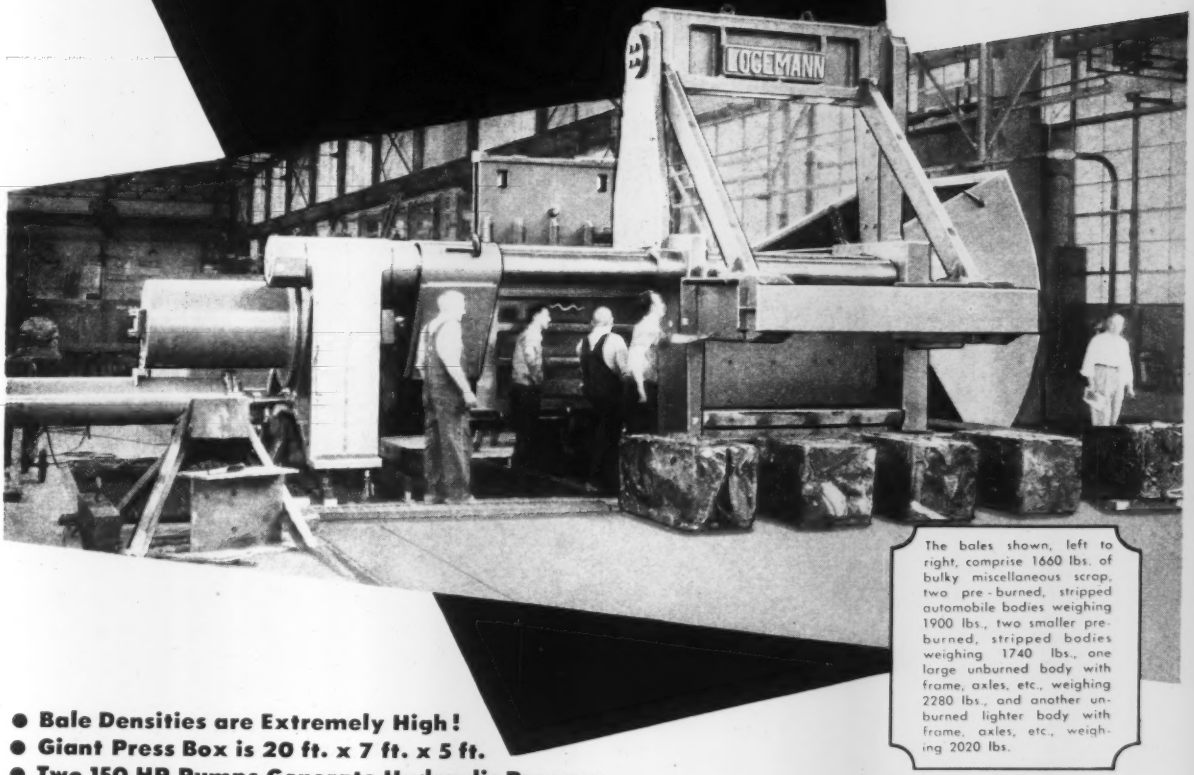
No. 1 machinery cast	45.00-50.00

†F.o.b. Hamilton, Ont.

LOGEMANN *presents*

the new giant triple-compression 4000-P Series of

SCRAP PRESSES



The bales shown, left to right, comprise 1660 lbs. of bulky miscellaneous scrap, two pre-burned, stripped automobile bodies weighing 1900 lbs., two smaller pre-burned, stripped bodies weighing 1740 lbs., one large unburned body with frame, axles, etc., weighing 2280 lbs., and another unburned lighter body with frame, axles, etc., weighing 2020 lbs.

- **Bale Densities are Extremely High!**
- **Giant Press Box is 20 ft. x 7 ft. x 5 ft.**
- **Two 150 HP Pumps Generate Hydraulic Pressure**

In this Logemann Scrap Press compressed bales measure 24 inches by 24 inches by a variable third dimension which is determined by the character and quantity of scrap charged. The first or gathering ram compresses the load of scrap from 20 ft. to 2 ft. . . . the intermediate side ram reduces the cross-dimension from 7 ft to 2 ft. . . . finally the third or finishing ram moves upward, to compress the vertical dimension into an extremely dense bale, ready for remelting. The cover is then withdrawn and the finishing ram elevates the compressed bale level with the top of the box, to allow the cover to push it off for loading into cars.

Two large 150 HP pumps generate hydraulic pressure for operating the press-rams at high pressures. Three smaller pumps are used to operate the press cover and the loading hopper. This hopper can be filled with miscellaneous scrap while the press is making a bale, and then dumped quickly into the box as soon as the preceding bale has been discharged.

The large pumps give rapid movement to all rams, and to handle their fluid delivery the operating-valves are proportionately over-size. These valves are operated by compressed air and easily controlled from a remote stand, through a bank of electrical switches and push-buttons, in front of the operator.

This same press can be used for baling bodies and extremely bulky scrap, also for making standard size, high-density bales of new sheet clips.

We are prepared to build many smaller sizes or larger, if required, to meet your specific requirements. You are invited to present your problem for discussion.

Write for details about the newly developed 3500-P series with tamping cover and side bale ejection and the new giant double compression press with box 20 ft. long, 7½ ft. wide, and 5 ft. deep.

LOGEMANN BROTHERS CO.

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Tariff Decision in April?

That's the latest guess on when the Tariff Commission will forward its recommendations on lead-zinc duties to the President. Higher import taxes are believed likely

Nonferrous Metal Prices, Pages 168 & 169

METALMEN who expect early Tariff Commission action on lead and zinc duties are in for a disappointment. Chances are nil that the commission will forward its recommendations to the President within the next month.

A source close to the commission told STEEL the recommendations will probably go to the White House about midspring. Best guesstimates peg the target date at between Apr. 15 and May 1.

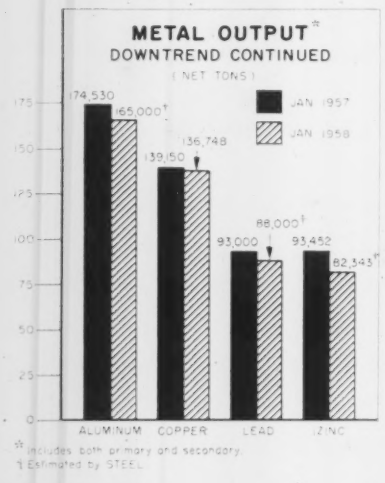
Actually, says a commission spokesman, a decision will be reached sooner than it would on most commodities eligible for relief under the escape clause provision. His reasoning: The commission usually takes the full nine months allowed between the day a relief petition is received and the decision date. The period for lead and zinc doesn't expire until June 27.

What Then?—After recommendations are filed with the White House, it's quite possible that there will be a 90-day lag before higher tariffs (if recommended) go into effect. The President has 60 days to study the recommendations, and he has traditionally used up this period. Now that he has a trade policy committee to advise him, it's more likely than ever that the full 60 days will be utilized.

A Presidential proclamation changing the tariff rate is the final step. Usually 30 days elapse between issuance of the proclamation and its effective date.

Consensus—Most people in the trade believe the commission will recommend that present duties (1.06 cents a pound for lead, 0.7 cent for zinc) be raised to the allowable maximum and that the President will go along. It would put the lead duty at 2.55 cents a pound and zinc at 2.1 cents. There's a strong feeling in the industry that even if the commission recommends the maximum increase, lead and zinc will still need Congressional help to equalize the foreign and domestic prices.

Imports are arriving in greater quantities than ever. Foreign lead is being offered in New York at around 2 cents a pound under the domestic quotation (13 cents a pound). Chicago sources say the situation's almost as bad there. Domestic producers say the East Coast is being flooded with special high grade and brass special zinc.



*Includes both primary and secondary.
†Estimated by STEEL.

Shipments—Sales of both metals lag even though a few companies report a slight pickup in February. Producers say shipments are running 10 to 20 per cent under year-ago levels. One indication: Total domestic slab zinc shipments in January hit 68,657 tons, compared with 83,100 tons in January, 1957. There's no sign of an early upturn.

Price—London Metal Exchange quotations continue weak. On Feb. 25 they stood at 9.34 cents a pound for lead, 7.87 cents for zinc. But domestic producers deny any plans to lower prices at this time.

Copper Weakens

Custom smelted copper is being sold in New York at between 23 and 23.5 cents a pound. Observers predict it may settle at 23 cents at any moment. It had been holding at 23.5 cents since custom smelters came down one-half cent a pound on Feb. 13.

Recently, companies have virtually stopped quoting a price on custom smelted copper. Says one observer: "It's sold at whatever price the buyer and seller can get together on."

Elsewhere in the copper market, dealers are selling at 22.875 cents a pound. Prices on the LME continue to fluctuate around 20 cents a pound. Primary producers still hold the line at 25 cents.

Metal Output Down

While January production for most metals is under year-ago levels (see chart), the differences are not substantial. Consensus is that output figures will begin to slide off shortly as the last few months' production curtailments are felt.

NONFERROUS PRICE RECORD

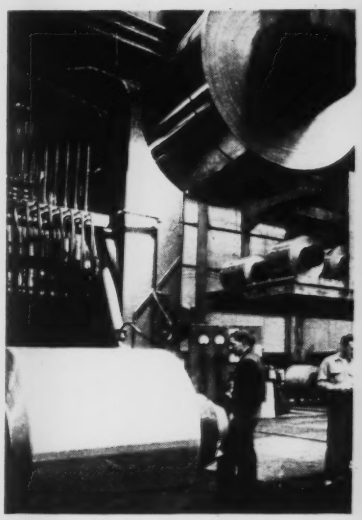
	Price Feb. 26	Last Change	Previous Price	Jan. Avg	Dec. Avg	Feb., 1957 Avg
Aluminum	26.00	Aug. 1, 1957	25.00	26.000	26.000	25.000
Copper	23.125–25.00	Feb. 25, 1958	23.50–25.00	25.135	26.130	32.863
Lead	12.80	Dec. 2, 1957	13.30	12.800	12.800	15.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	94.75	Feb. 26, 1958	95.125	92.933	92.395	101.159
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

Olin Aluminum

pig...ingot...billet...flat sheet...
coiled sheet...fin stock...plate...
extrusions...solid...hollow...
semi-hollow...pipe and tubing...
rod and bar...electrical conductor...

is ready to Serve



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Atlanta ------- TRinity 2-5824	Kansas City --- PLaza 3-2055
Baltimore ----- VAlley 3-1426	Los Angeles -- DUnkirk 5-3231
Boston ----- VOlunteer 2-2148	Memphis ---- JAckson 7-2571
Chicago ----- ORchard 4-6886	Miami -------- PLaza 7-0635
Cincinnati ---- CApitol 1-6030	Milwaukee - BRoadway 3-8266
Cleveland --- SUperior 1-4964	Minneapolis-----UNion 9-9289
Dallas ----- FLeetwood 7-1591	New Haven ---- SPruce 7-1491
Dayton ------ BAldwin 4-9631	New York ----- PLaza 1-4540
Detroit ------- LIberty 9-5500	Philadelphia - MOhawk 4-6100
Houston ---- OVerland 2-3645	Pittsburgh ----- GRant 1-3855
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OLIN MATHIESON CHEMICAL CORPORATION

OLIN ALUMINUM

Symbol of Quality and Service in the Aluminum industry

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10. 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90. 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 23.50-24.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.55 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $55-90 per lb, nom.

Copper: Electrolytic, 25.00 deld.; custom smelters, 23.125; lake, 25.00 deld.; fire refined, 24.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-90 nom. per troy oz.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis, New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. thick, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $226-230 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $70-100 per troy oz nom.

Palladium: $19-21 per troy oz.

Platinum: $72-75 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 88.625 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 94.75; prompt, 94.50.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.85.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Diecasting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.00-25.50; No. 12 foundry alloy (No. 2 grade), 21.00-21.75; 5% silicon alloy, 0.60 Cu max., 25.00-25.25; 13 alloy, 0.60 Cu max., 25.00-25.25; 195 alloy, 24.00-26.00; 108 alloy, 21.50-21.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.00; grade 2, 21.25; grade 3, 20.00; grade 4, 18.00.

Brass Ingot: Red brass, No. 115, 25.75; tin bronze, No. 225, 34.50; No. 245, 29.25; high-leaded tin bronze, No. 305, 29.75; No. 1 yellow, No. 405, 21.25; manganese bronze, No. 421, 23.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.80, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.78, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 30.355; l.c.l., 30.98. Weatherproof, 30,000-lb lots, 32.53; l.c.l., 33.28. Magnet wire deld., 38.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; Plate, $12.50-19.20; H.R. strip, $12.50-22.90.

ZIRCONIUM

C.R. strip, $15.00-31.25; forged or H.R. bars, ribbon zinc in coils, 20.50; plates 19.00, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strips, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.017	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	44.40	51.20
6061-T6	46.90	53.00
2024-T4	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, random lengths: 2014-F, 46.90-53.90, diam. 1-8 in.; 6061-F, 43.50-53.90, diam. 1-6 in.; 7075-F, 63.50-73.90, diam. 1-3.875 in.; 7079-F, 68.50-78.90, diam. 1-3.875 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.00-13.50; old sheets, 10.00-10.50; borings and turnings, 6.50-

BRASS MILL PRICES

MILL PRODUCTS a — SCRAP ALLOWANCES f

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.13b	45.36c	....	48.32	21.000	21.000	20.250
Yellow Brass	42.69	31.03d	43.23	45.60	16.125	15.875	14.500
Low Brass, 80%	44.90	44.84	45.44	47.71	17.875	17.625	17.125
Red Brass, 85%	45.67	45.61	46.21	48.48	18.625	18.375	17.875
Com. Bronze, 90%	46.98	46.92	47.52	49.54	19.250	19.000	18.500
Manganese Bronze	50.81	44.91	55.44	....	14.875	14.625	14.125
Muntz Metal	45.19	41.00	....	....	15.125	14.875	14.375
Naval Brass	47.07	41.38	54.13	50.48	14.875	14.625	14.125
Silicon Bronze	52.84	52.03	52.88	54.77	20.625	20.375	19.625
Nickel Silver, 10%	57.93	60.26	60.26	....	21.125	20.875	10.562
Phos. Bronze, A-5%	67.17	67.67	67.67	68.85	21.875	21.625	20.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.00-10.50; industrial castings, 10.00-10.50.

Copper and Brass: No. 1 heavy copper and wire, 17.00-17.50; No. 2 heavy copper and wire, 15.00-15.50; light copper, 13.00-13.50; No. 1 composition red brass, 14.50-15.00; No. 1 composition turnings, 13.50-14.00; new brass clippings, 12.50-13.00; light brass, 8.50-9.00; heavy yellow brass, 11.00-11.50; new brass rod ends, 11.50-12.00; auto radiators, unsweated, 11.00-11.50; cocks and faucets, 11.50-12.00; brass pipe, 11.00-11.50.

Lead: Heavy, 8.50-9.00; battery plates, 3.50-3.75; linotype and stereotype, 11.00-11.50; electrotype, 10.00-10.25; mixed babbitt, 11.00-11.50.

Monel: Clippings, 28.00-29.00; old sheets, 25.00-26.00; turnings, 20.00-23.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 42.00-45.00; rolled anodes, 42.00-45.00; turnings, 37.00-40.00; rod ends, 42.00-45.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.00-16.25; 3003 clippings, 16.00-16.25; 6151 clippings, 15.50-16.25; 5052 clippings, 15.50-15.75; 2014 clippings, 15.00-15.75; 2017 clippings, 15.00-15.75; 2024 clippings, 15.00-15.75; mixed clippings, 14.50-14.75; old sheets, 12.25-12.50; old cast, 12.25-12.50; clean old cable (free of steel), 15.25-15.50; borings and turnings, 12.75-13.75.
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 51.00; light scrap, 46.00; turnings and borings, 31.00.

Copper and Brass: No. 1 heavy copper and wire, 19.00; No. 2 heavy copper and wire, 17.50; light copper, 15.25; refinery brass (60% copper) per dry copper content, 17.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 19.00; No. 2 heavy copper and wire, 17.50; light copper, 15.25; No. 1 composition borings, 16.50; No. 1 composition solids, 17.00; heavy yellow brass solids, 11.50; yellow brass turnings, 10.50; radiators, 13.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 41.79; oval, 40.00, 5000-10,000 lb; electrodeposited, 31.25, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 10-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 113.50; 200-499 lb, 112.00; 500-999 lb, 111.50; 1000 lb or more, 111.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.
Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 68.40; 300-900 lb, 66.40; 1000-19,900 lb, 64.40.

Copper Sulphate: 100-1900 lb, 13.70; 2000-5900 lb, 11.70; 6000-11,900 lb, 11.45; 12,000-22,900 lb, 11.20; 23,000 lb or more, 10.70.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400-9999 lb, 43.50; 10,000 lb or more, 40.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 75.80; 100-600 lb, 66.80; 700-1900 lb, 64.00; 2000-9900 lb, 62.20; 10,000 lb or more, 60.80.

Stannous Chloride (anhydrous): Less than 25 lb, 165.30; 25 lb, 130.30; 100 lb, 115.30; 400 lb, 112.90; 5200-19,600 lb, 100.70; 20,000 lb or more, 88.50.

Stannous Sulphate: Less than 50 lb, 128.10; 50 lb, 98.10; 100-1900 lb, 96.10; 2000 lb or more, 94.10.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 163)

of consumption this month.

Trade observers believe it is only a question of time before additional blast furnaces will be shut down. Of the Chicago district's 43 blast furnaces, 25 are operating and there is some question whether this number can be held if March steelmaking and foundry operations dip more.

While the Buffalo steel rate has sagged to 39 per cent of capacity, pig iron production remains considerably higher with 12 of 16 stacks still producing. Some blast furnaces will be shut down unless the output of open hearth shops picks up. The merchant iron market is not prepared to absorb the excess production of iron now being generated at steel mills.

In the Cleveland district, only four of ten blast furnaces are lighted.

Foundry operators in the Pacific Northwest are optimistic. They point out that demand for castings improved in February and that their order backlogs are larger. Normal bookings for the second quarter are expected. Public works projects are calling for foundry goods in increasing quantity as the season advances.

Pig Iron Production Off

Blast furnace production (pig iron, ferromanganese, and spiegeleisen) amounted to 4,854,444 net tons in January, reports the American Iron & Steel Institute. It breaks down: Pig iron, 4,785,269 tons, vs. 5,212,624 in December and 7,209,547 in January, 1957; ferromanganese and spiegeleisen, 69,175 tons, vs. 66,756 in December and 72,826 in January a year ago.

Operations averaged 62.8 per cent of capacity (91,000,110 tons) in January, compared with 71.6 per cent in December and 98.8 per cent in January, 1957 (86,817,950 net tons capacity).

Production in January by districts:

BLAST FURNACE PRODUCTION—JANUARY
(Net tons)

Districts	Pig Iron, Ferromanganese & Spiegeleisen January, 1958	January, 1957
Eastern	1,244,699	1,509,390
Pittsburgh-Youngstown	1,486,684	2,577,581
Cleveland-Detroit	513,436	842,601
Chicago	968,300	1,481,529
Southern	398,333	515,583
Western	242,992	355,689
Total	4,854,444	7,282,373

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11" to 12½" Diameter .085 to .095

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Established Manufacturer's Agent is desirous of representing additional lines in Western Pennsylvania, West Virginia, and Eastern Ohio. Preferably those products sold direct to steel mills or steel mill equipment builders. Write Box 643, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

"Help Wanted." Mill representatives for steel tube producer. Several areas open including Missouri, Texas, Mississippi, Louisiana, North and South Carolina, Kentucky and Tennessee. Write Box 471, Sheffield, Alabama.

Positions Wanted

METALLURGICAL CONSULTANT

Available for Melt Shop Problems in technical and customer service. Broad industrial experience in all processes for carbon, low and high alloy iron and steelmaking. Box 640, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALES MANAGER OR EQUIVALENT—Ten years sales with fire brick, clay, etc. to steel mills, foundries, etc. B.S. in Metallurgy. Write Box 642, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALES EXECUTIVE: Graduate engineer with extensive background in sales management, engineering, production and costing of alloys and their fabrication into process equipment for the chemical, petroleum, pharmaceutical and A.E.C. fields. Write Box 641, STEEL, Penton Bldg., Cleveland 13, Ohio.

POSITION WANTED: With aggressive ornamental iron, aluminum and stainless steel fabricator; capable of assuming complete charge of and co-ordinating sales, estimating and engineering departments in the above metals or structural steel. Thrity years continuous experience with top companies. Age 50 years, neat appearance and good health. Could be available in 60 days. Write Box 638, STEEL, Penton Bldg., Cleveland 13, Ohio.

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For heavy, continuous service in steel storage yards

The 40-ton, 75-foot span, heavy duty crane shown above is typical of many similar NORTHERN CRANE installations in steel mills, fabricating plants, and similar plants in heavy industry.

NORTHERN mill type cranes are designed and built to meet the most exacting requirements, providing for continuous service, maximum loads, and high impact allowances. Mill type motors and control equipment provide highest electrical performance.

NORTHERN CRANES are the result of over 55 years' experience in the design of overhead electric traveling cranes, heavy duty electric hoists and other materials handling equipment.

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NORTHERN MATERIALS HANDLING EQUIPMENT

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

Iron Ore . . .

Iron Ore Prices, Page 159

Prices on Lake Superior iron ore to be delivered during the 1958 lake shipping season will be unchanged from those prevailing throughout the 1957 season, the Cleveland-Cliffs Iron Co., Cleveland, said last week. As in 1957, the 1958 prices will be firm for the season.

During 1957, shippers absorbed increases in rail and lake freights, as well as wage and salary increases. The 5 per cent hike in upper lake rail freight, published Feb. 15, and the wage increases to become effective on July 1 this year, also will be absorbed.

Imports of iron ore in November totaled 2,589,540 gross tons valued at $22,019,179, reports the U. S. Bureau of Mines. The November intake brought imports for the first 11 months of 1957 to 31,766,265 tons valued at $268,824,374. In 1956, the November total was 2,588,995 tons valued at $21,886,329, while the 11-month total was 28,726,852 tons valued at $237,384,608.

Comparative figures are given in the following table:

IRON ORE IMPORTS—11 Months, 1957-1956
(Exclusive of ore containing 10 per cent or more manganese)

Origin	1957 Gross Tons	1956 Gross Tons
Brazil	1,351,040	1,133,410
British W. Africa	159,896	152,098
Canada	12,523,322	13,631,843
Chile	2,416,392	1,303,077
Cuba	33,166	89,941
Denmark	98	169
Dominican Republic	138,795	158,272
Liberia	955,235	1,071,960
Mexico	212,270	124,698
Peru	2,210,907	1,661,916
Sweden	620,400	965,262
Union South Africa	14,298	.....
United Kingdom	390	572
Venezuela	11,127,027	8,400,829
West Germany	29	.....
Algeria	.....	10,600
French Morocco	.....	6,500
Iran	.....	3,937
Totals	31,766,265	28,726,852

Alloy Steel . . .

Last year, shipments of alloy steel (other than stainless) totaled 4,743,213 net tons, reports the American Iron and Steel Institute. The movement was off 815,200 tons, about 15 per cent, from the 5,558,413 tons shipped in 1956.

Of total 1957 shipments, 3,995,387 tons were full alloy; 747,826 tons were high strength, low alloy steels. In 1956, full alloy shipments amounted to 4,735,762 tons; high strength, low alloy, 822,651 tons.

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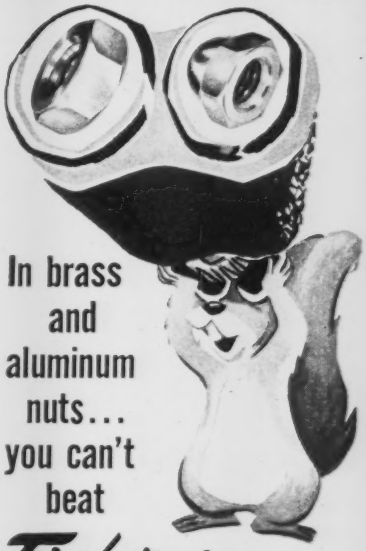

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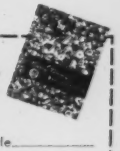

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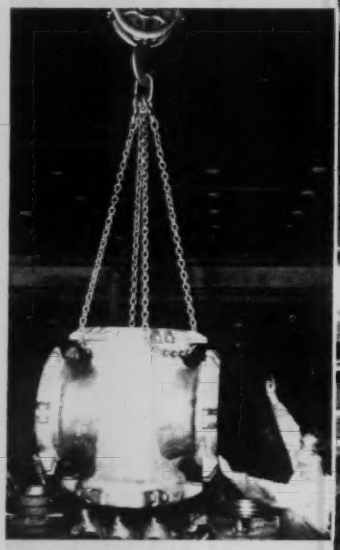

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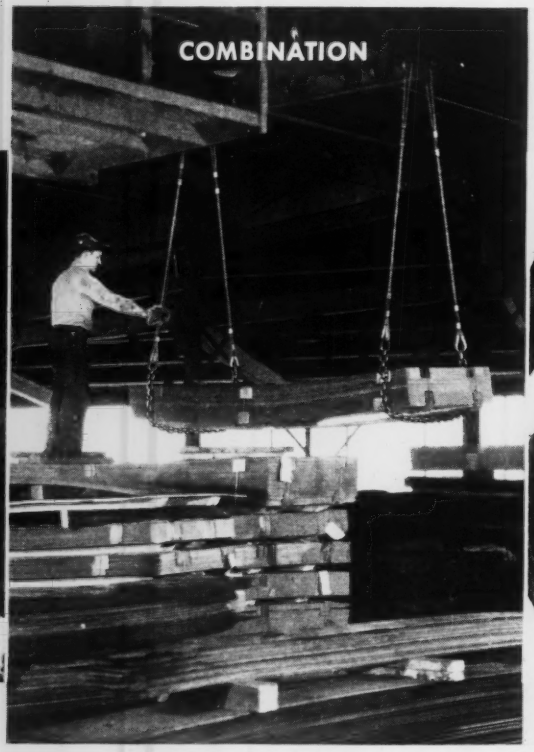

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Because sling work requirements do vary from job to job, make certain that all your slings are precision-made under uniform conditions of quality control and pre-tested before they leave the factory. Only ACCO *Registered* Slings can give you this assurance...in the widest range of sizes and styles from any single source.

In addition, you get the latest technical improvements in ACCO *Registered* Slings. For example, there's the new shaped Master Link now available without extra charge on all ACCO *Registered* Slings. This new link, an exclusive development of ACCO engineers, gives 18% greater resistance to distortion with no increase in weight. Just one more quality bonus you get from ACCO *Registered* Slings.

Each of these slings is factory proof-tested at a load of no less than twice its rated capacity. Only after a sling has passed this rigorous test is it given the ACCO tag and certificate of registration.

Tell your distributor you prefer ACCO *Registered* Slings.

WHAT "ACCO REGISTERED" MEANS

1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring or tag on each sling
6. Signed Registry Certificate with each sling

AMERICAN CHAIN & CABLE
BRIDGEPORT, CONN.

ACCO

Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Wilkes-Barre, Pa., York, Pa.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

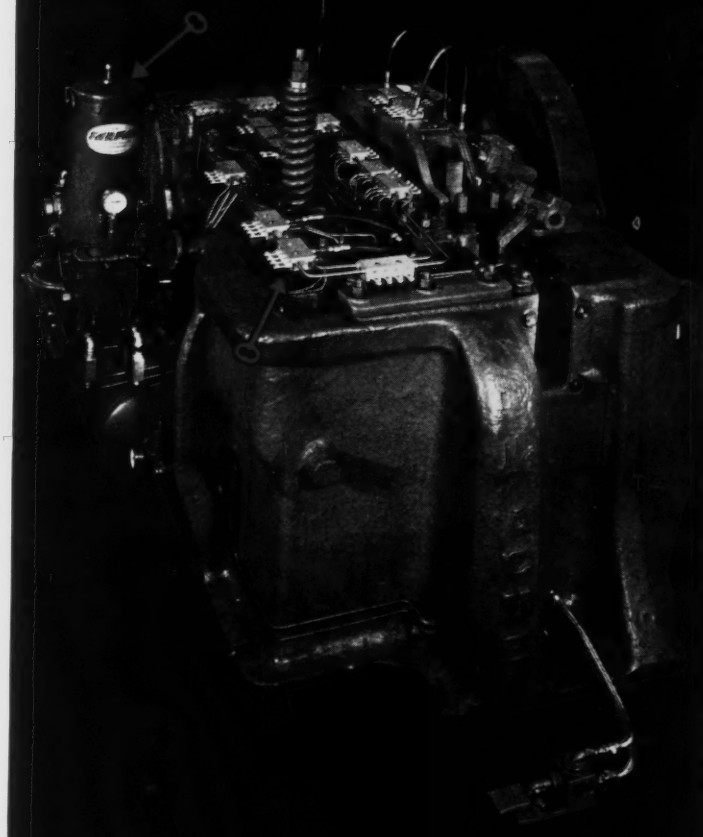
FARVAL—*Studies in Centralized Lubrication*
No. 218

Farval lubrication first choice for Hill-Acme Upsetter

BUILDING peak performance into their machines is a point-of-pride with Hill-Acme. That's why you'll find Farval lubrication systems on H-A machines such as this upsetter.

When the going's rugged, with shock, vibration and wear trying to take their toll, Farval continuously guards 59 vital bearings . . . continuously delivers measured amounts of lubricant at regular intervals.

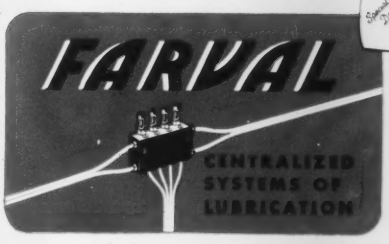
More and more, machine designers, engineers and production men are turning to Farval for the kind of lubrication that spells uninterrupted, maintenance-free production. Let us tell you more. Write for Bulletin 26-S. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.



On this 1¼-inch Hill-Acme Upsetter, Farval's timing cycle can easily be changed to conform with the service of the macnine. Amount of lubricant delivered to each bearing is also adjustable.

KEYS TO ADEQUATE LUBRICATION

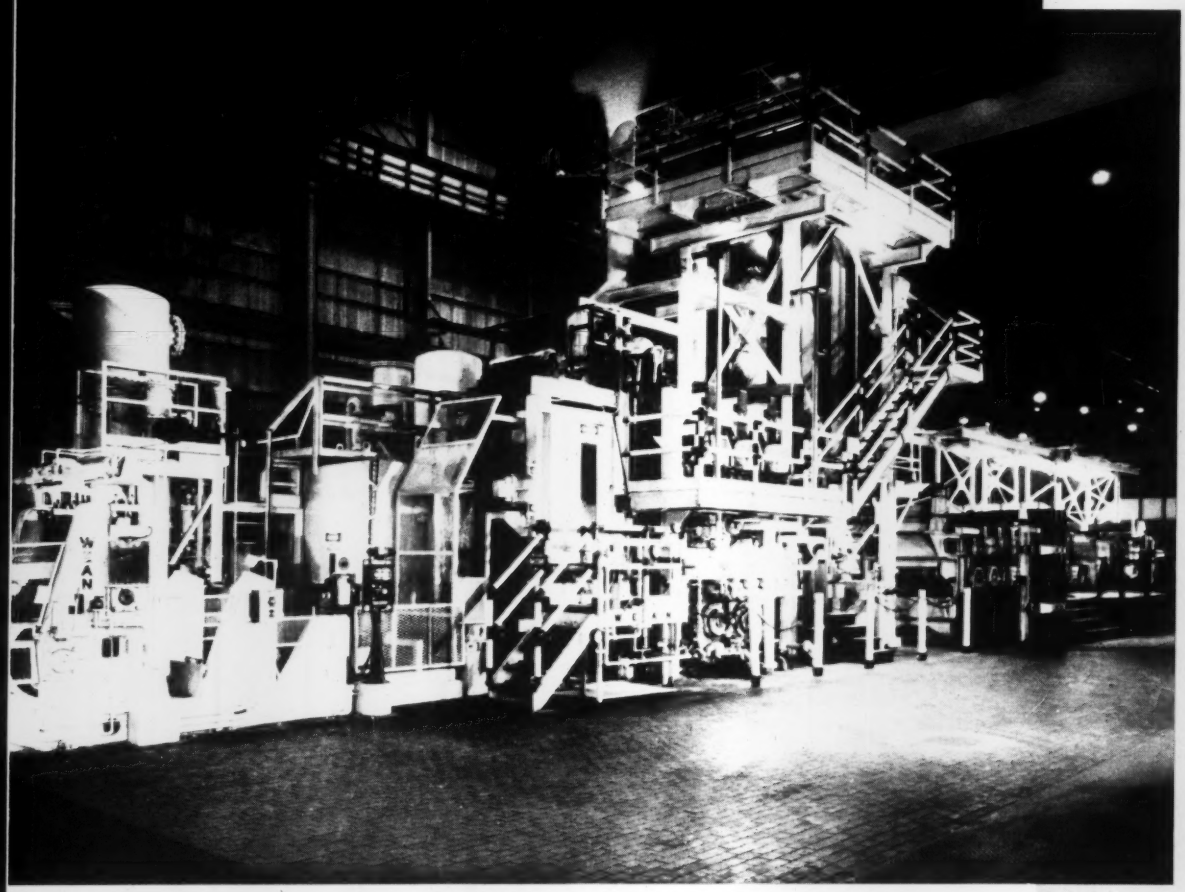
Wherever you see the sign of Farval—familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated.



Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

Electrolytic tinning lines maintain highest product quality through

WEAN CREATIVE ENGINEERING



VIRTUALLY since the inception of the idea, Wean has played a major role in the successful development and manufacture of equipment for the production of tin plate by the Electrolytic process. Wean-engineered tin plate lines have established outstanding production records, but of equal importance, these same lines have continuously maintained highest product standards to meet industry's ever increasing demand for quality . . . in quantity.

Wean has engineered forty-seven Electrolytic tin lines to date. Why not avail yourself of this vast specialized experience to solve your tin plate production problems?

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THE WEAN ENGINEERING COMPANY INC., WARREN, OHIO